EDITORIAL STAFF

E. L. SHANER
Editor-in-Chief

E. C. KREUTZBERG
Editor

A. J. HAIN
Managing Editor

E. F. ROSS
Engineering Editor

GUY HUBBARD
Machine Tool Editor

D. S. CADOT
Art Editor

ASSOCIATE EDITORS

G. H. MANLOVE — J. D. KNOX
W. G. GUDE — G. W. BIRDSALL
W. J. CAMPBELL

New York
I. H. SUCH — B. K. PRICE
L. E. BROWNE

Pittsburgh — *Chicago*
R. L. HARTFORD — J. F. POWELL

Detroit — *Washington*
A. H. ALLEN — L. M. LAMM

London
VINCENT DELPORT

BUSINESS STAFF

G. O. HAYS
Business Manager

C. H. BAILEY
Advertising Service

New York . . E. W. KREUTZBERG, B. C. SNELL
Pittsburgh . . . S. H. JASPER
Chicago . . . L. C. PELOTT, W. F. O'DELL
Cleveland . . . R. C. JAENKE, D. C. KIEFER

J. W. ZUBER
Circulation Manager

MAIN OFFICE

Penton Building, Cleveland

BRANCH OFFICES

New York . . . 110 East 42nd St.
Chicago . . Peoples Gas Building
Pittsburgh . 1800 Koppers Building
Detroit . . 1010 Stephenson Building
Washington . National Press Building
Cincinnati . . . 282 Sinton Hotel
San Francisco . . 1100 Norwood Ave.
Oakland, Calif., Tel. Glencourt 7559
London . . . . Caxton House, Westminster, S.W. 1
Berlin . Berlin, N.W. 40, Roonstrasse 10

• ● •

Published by THE PENTON PUBLISHING CO., Penton Building, Cleveland, Ohio. JOHN A. PENTON, Chairman of Board; E. L. SHANER, President and Treasurer; J. R. DAWLEY and G. O. HAYS, Vice Presidents; F. G. STEINEBACH, Secretary.

Member, Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers' Association.

Published every Monday. Subscription in the United States, Cuba, Mexico and Canada, one year $4, two years $6; European and foreign countries, one year $10. Single copies (current issues) 25c.

Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879.

Copyright 1939 by the Penton Publishing Co.

STEEL

ESTABLISHED 1882

Contents

Volume 104—No. 7 **February 13, 1939**

READER COMMENTS 17
AS THE EDITOR VIEWS THE NEWS 21
NEWS
- Production Waves and Price Policies 23
- Heavy Industries at Disadvantage Under Merit Rating Tax Provisions 25
- Evans, Central's Executive Head 26
- Producers' Steel Stocks Advanced 26
- Steelworks Operations for Week 27
- Steel Capacity at Record High 27
- "Be Loyal to Government; Make a Profit," Advice at Del Monte 28
- Steady Increase in Shipbuilding 29
- 800 Firms Contribute to Aircraft; $200,000,000 Output Seen in 1939 30
- Activities of Steel Users and Makers 31
- Meetings 31
- Steel Products for Sale Down 45 Per Cent 35
- Men of Industry 40
- Obituaries 41

WINDOWS OF WASHINGTON 33
MIRRORS OF MOTORDOM 37
EDITORIAL—Informed Workers Do Not Impede Progress 42
THE BUSINESS TREND
- Activity Index Drifts to Lower Levels 43
- Charts and Statistics 43-45

FORUM ON RE-EMPLOYMENT 46
TECHNICAL
- Conditioning Mill Rolls 48

METAL FINISHING
- Continuous Ternes 50

POWER DRIVES
- Friction Loads 52

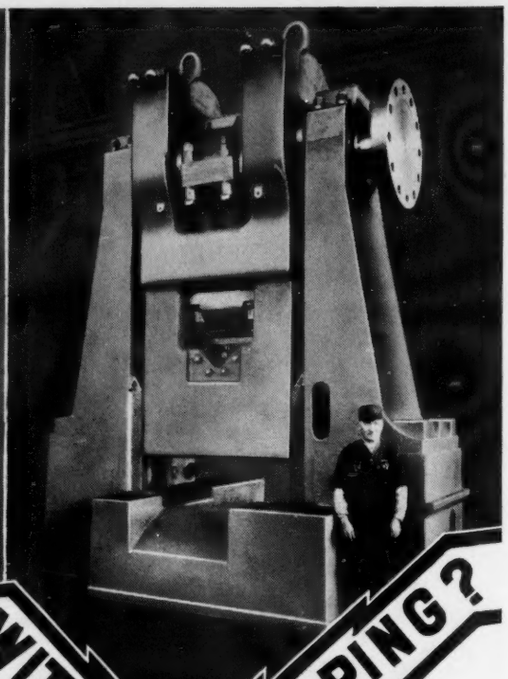
PROGRESS IN STEELMAKING
- Modernizes Hand Mill 58

JOINING AND WELDING
- Welded Locomotive 64

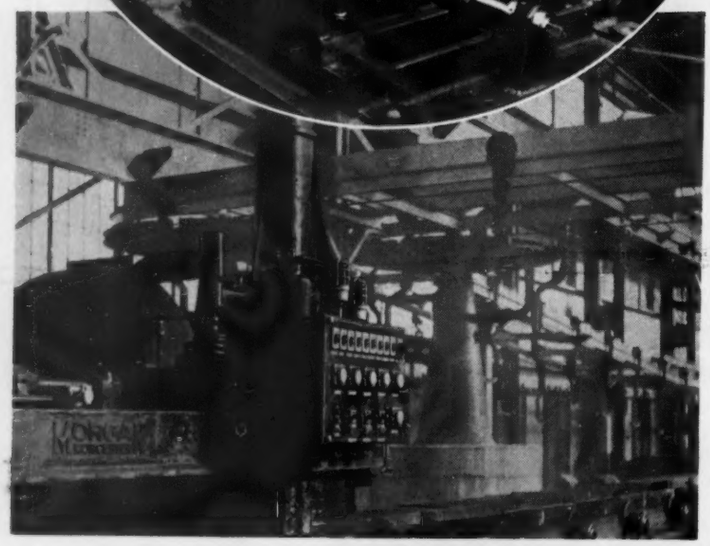
MATERIALS HANDLING
- Coil Conveyors 69

NEW METAL PRODUCTS 72
INDUSTRIAL EQUIPMENT 76
HELPFUL LITERATURE 77
MARKET REPORTS AND PRICES 83
- The Market Week 84

BEHIND THE SCENES 94
CONSTRUCTION AND ENTERPRISE 102
INDEX TO ADVERTISERS 108



ARE YOU CROPPING WITHOUT STOPPING?



Are your shearing operations "bottle necks" in the path of greater production? This lag can be minimized by installing Morgan Shears. They are available in any size required: Flying Shears from the smallest to giants capable of cutting 30 square inches of hot steel at 900 feet per minute; Up-and-Down Cut Shears, Bloom Shears, Rotary Shears, and Bar Shears.

Problems that relate to any operation in the rolling mill may be safely referred to Morgan Engineers. With their specialized knowledge of modern mill practice and their broad experience in levelling out production lags, they offer you a valuable service. Their carefully considered recommendations are often the first step to lower operating costs and more profitable production.

MORGAN CONSTRUCTION CO.
WORCESTER, MASSACHUSETTS, U. S. A.

R-50

Let MORGAN WORCESTER ENGINEERS AND MANUFACTURERS *Remove the Lags*

As the Editor Views the News

■ STEEL production last week (p. 27) again moved up 1 point, to 54 per cent of ingot capacity and no noteworthy fluctuation either above or below this level is expected over the next few weeks. This fact is of interest in further analysis of the financial reports of nine steel producers that represent 74 per cent of the country's capacity. In the second half of last year these companies (p. 24) began to show a little profit at an average ingot rate of 45.5 per cent. But it must be remembered that the reports covered many fabricating and other operations in no way related to the production of steel. On a strictly steelmaking basis, it seems likely that the "break-even" point for these companies occurs when ingot production is in the neighborhood of 60 per cent.

• • •

Scope of Aircraft

Steel production capacity again stands at a new high. As a result of an increase of 1,467,249 gross tons last year (p. 27), ingot and castings capacity now is 73,061,569 tons. . . . The aircraft industry rapidly is growing to major proportions. More than 800 companies (p. 30) now build aircraft or parts. The industry now represents an investment of $75,000,000. Last year it produced units worth $140,000,000; this year's output is expected to bring $200,000,000. . . . Shipbuilding (p. 29) continues to expand. Under construction in American yards Feb. 1 were 177 ships aggregating 667,980 gross tons; this compares with 91 vessels a year ago. . . . Harry L. Hopkins (p. 33) is to enunciate his policies as secretary of commerce in a speech at Des Moines Feb. 24.

• • •

Speculative Buying

Steel warehouses, says A. Oram Fulton (p. 28), now handle about 14 per cent of all steel produced in this country and sell to more than 200,000 consumers. . . . STEEL'S survey (p. 25) shows that state unemployment compensation laws will bear more heavily on the producers of so-called capital goods than on those that manufacture consumer goods, whose production can be more easily stabilized. . . . Admittedly, speculative buying is a difficult problem in the steel industry, because no company could afford to make a price advance immediately effective unless its competitors did likewise. But STEEL'S study (p. 23) shows wide dislocation on occasion results from speculative buying. . . Liquefied butane-propane mixtures now are in successful use (p. 37) as motor truck fuels.

• • •

Political Barriers

An immediate solution to the problem of unemployment would be effected if there were acknowledgment on the part of political and business leaders that strenuous measures must be adopted in order to protect our country, says Robert A. Weaver. He cites (p. 47) how numerous difficult problems have been overcome in England through non-partisan commissions and holds that politics should be eliminated from our national administration for the public good. . . . Grinding practice is an important factor in producing proper surfaces on rolls; an authority (p. 48) discusses such factors as speed, feed and type of wheel. . . . Through a combination of modern cold rolling, electrocleaning and processing methods one mill (p. 50) now is able to sell terne roofing in rolls without seams.

• • •

Simple Methods

In selecting motors for given drives, the proportion of frictional to total load must be taken into account. The amount of the frictional load (p. 52) may be determined by simple methods. . . . A recently modernized sheet hand mill (p. 58) is featured by an automatic cut-to-length and doubling line and is supplemented by two modern hot-dip galvanizing lines. A new electromagnetic weighing device affords instantaneous check on sheet weight. . . . A locomotive manufacturer (p. 64) finds one-piece construction by welding to result in uniform distribution of stresses, in a reduction in the weight-to-power ratio and in lower production costs. . . . Specially engineered roller conveyor systems (p. 69) permit efficient handling of coils at the new Irvin works.

E C Kreutzberg

. . Phone . . Wire . . or Write for Quick Stock Shipment

When a man's in a hurry for steel, he gets quick action at Ryerson. He gets steel that has uniform machining and fabricating qualities, so that no time will be lost in the shop. He gets this steel at no additional cost.

Ryerson CERTIFIED Steels include all kinds—from Open Hearth Carbon Bars to highly polished Stainless—Shafting to Structurals—each having the qualities most desirable in the particular type of steel. More than 10,000 sizes and kinds are in stock for Immediate Shipment. Special order and dispatch systems—experienced steel men with modern equipment and every shipping facility are your assurance against delay.

When you need steel, of any kind, phone wire or write the nearest Ryerson Steel-Service plant and get prompt shipment of uniform high quality steel certified by Ryerson.

Joseph T. Ryerson & Son, Inc. Plants at: Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON *Certified* STEELS

Production Waves and Price Policies

■ **Comparisons Show Current Consumer Requirements Far Outweigh Influence of Price Advances as Factors in Steelworks Operations—Should Speculative Buying Be Discouraged?**

◆

■ WHAT is the relation between changes in finished steel prices and subsequent variations in steel production? Is the industry contributing to instability in its operations by permitting a lapse between the announcement and application of an increase in quotations?

If experiences of recent years are examined in seeking answers to these questions, the fact becomes evident that circumstances other than prices have had an important influence on the abrupt advances and decreases in operations which have been the lot of steelmaking since 1932.

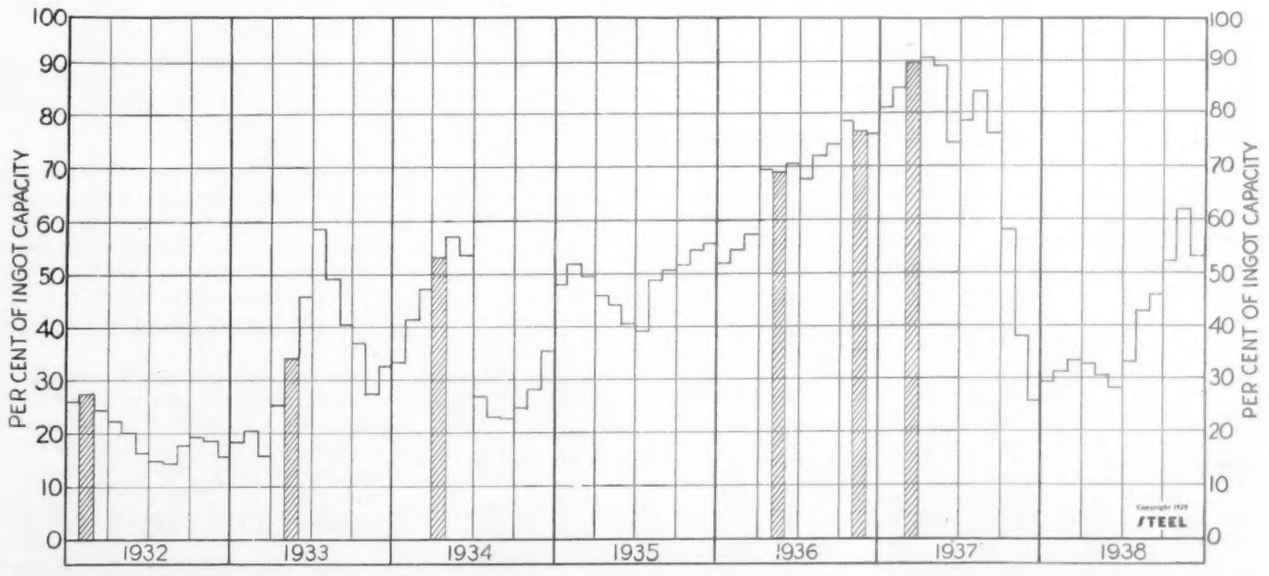
No other period in history has seen so many diverse fluctuations crowded into so few years, but the motivating influence behind the ebb and flow of production had its inception in the general trend of steel consumption. And while it is evident that movements of steel prices were instrumental in regulating output during relatively brief periods in certain years, the extent to which steel buyers took advantage of these revisions dictated amount by which operations reflected price changes.

The accompanying chart plots the trend of steel ingot production by months since 1932. Shaded blocks indicate the months in which major price advances were announced, effective either the succeeding quarter or sooner. Instances in which price increases were confined to only a few products are not designated, the intent being to show the steelmaking trend following the more important upward revisions.

Quarters for which quotations were reaffirmed would be expected to find production regulated by factors other than price. For instance, operations invariably increase in the first quarter, regardless of price changes. Consequently, the steelmaking trend in such periods is without significance, so far as the influence of prices is concerned. Inspection of the course of ingot output following an advance in quotations usually shows a rising trend.

Influence of the price change in causing this upturn varied in the

Steelworks Operations in Relation to Price Advances



■ **Shaded month indicates period in which major price increases were announced, effective for the following quarter or sooner, the purpose being to show the trend of production following such increases. Price renewals or reductions—exerting less or no influence on operations—are not noted on the chart**

different periods under consideration. Moreover, since prices usually are advanced at a time when business already is expanding and since only on such occasions are buyers interested in taking advantage of a pending boost in quotations, it is obvious that price increases alone are unable to start the steelmaking rate climbing.

This fact was demonstrated early in 1932. In February that year second quarter price increases were announced on a number of products. Consumption was low and the outlook dreary. Prices had been declining steadily for three years and buyers saw no occasion to anticipate future needs. As a result demand and operations continued to moderate.

Revival After Banking Crisis

The situation a year later was just the opposite. Following the March banking crisis, business started to quicken. Security and commodity prices strengthened, and talk of inflation was in the air. Steelmaking was expanding. When a steel price increase was announced early in May it was greeted with a sharp bulge in orders. Seemingly the depression was on its way out.

Consumption was unable to rise as rapidly as buying, however, and the inevitable relapse appeared after July, 1933, with mills waiting for users to absorb excess stocks and re-establish a balance between supply and demand. Additional prices were advanced the fourth quarter, although by the end of the year natural recovery forces again were stimulating orders, and the first quarter of 1934 saw steelmaking increasing.

In February, second quarter prices were reaffirmed, but early in April quotations were raised $3 to $8 a ton. Buyers promptly took advantage of the ten-day respite granted prior to application of the new figures, and second quarter production was boosted to an artificially high level. Under NRA code regulations shipment of low-price tonnage was necessary before the end of June. The decline in operations in July was drastic, and for five months production held at barely one-half the pace maintained in the second quarter.

Business was on the road to recovery from this slump by the end of 1934, and steelmaking was on a substantially higher plane the first quarter of 1935. However, recovery from a low of 23 per cent in September, 1934, to a high of 52 per cent in February the following year was accomplished without benefit of price changes.

Steady business gains marked 1936, the trend being upward throughout the year. A small price increase for third quarter was announced late in May, and while the amount was insufficient to stimulate speculative buying materially, demand was sustained through the summer instead of declining seasonally, as is commonly the case for that period.

Another increase was announced in November, to become applicable the following quarter, and operations continued strong through the usually quiet year-end period. Early 1937 saw industrial activity reach its peak. Wage boosts prompted another general price increase in March, and this, coupled with prospects of labor difficulties, set off additional waves of anticipatory buying.

Again, consumption could not keep pace with production, orders were shut off, and in the closing three months of the year operations plummeted to only one-third the September rate. Once more a period of adjustment and stock absorption became necessary. By July last year the tide had turned. Steel prices were reduced and helped to promote buying in some instances, although the fact that a closer relationship again had been established between supplies and consumption was the principal influence behind the upturn.

Effect of Cut Last Fall

While price reductions ordinarily exert little stimulus on buying when business is in the doldrums—as was evidenced in 1932—the temporary cut in sheet quotations last fall illustrates what happens when large concessions are held before busy consumers. Orders poured into mills. However, the reason buyers were so anxious for a place on producers' books was the fear the shaded levels were only temporary—as actually was the case. Had the lower levels been guaranteed through this quarter there would have been no occasion for the buying rush nor for the unusual November spurt in steelmaking. Also it is regarded doubtful whether in the long run actual consumption would have been materially less had prices been maintained throughout last quarter.

While evidence supports a contention that price changes have played a part in intensifying the swings in steel operations and employment of the past seven years, circumstances primarily responsible for this instability are beyond the control of the industry.

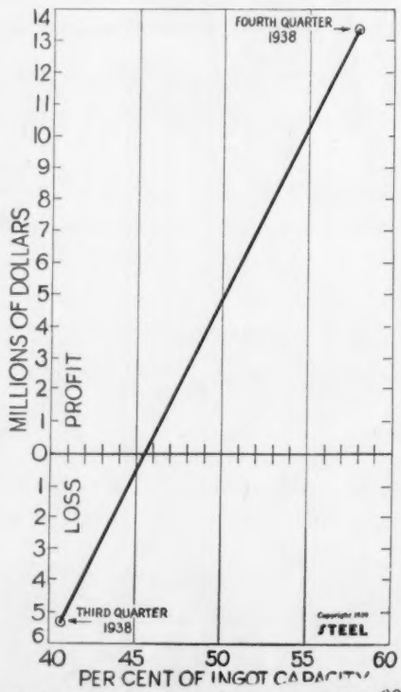
The original depression and more recently the demands of labor both imposed conditions necessitating large price changes. Revisions in smaller amount make speculative buying less attractive, and are more characteristic of a period in which business is free of the many uncertainties and disturbances such as have marked the years since 1932. If and when these distractions are removed conditions conducive to speculation will go with them and im-

"Break-Even" Point Now About 45.5 Per Cent

■ That the "break-even" point for steel producers has risen considerably in recent years is indicated by financial reports for third and fourth quarters, 1938. In STEEL, April 15, 1935, it was calculated for the period 1929-34, inclusive, as an operating rate of 41.7 per cent of ingot capacity. Returns from nine leading interests, representing 74 per cent of capacity, for the third quarter last year showed a combined net loss of $5,308,318, when the steel rate averaged 40.8 per cent.

For fourth quarter, they reported total net profit of $13,364,000, when operations for the industry averaged 55.8 per cent. The experience in these two periods indicates the "break-even" point was approximately 45.5 per cent.

The point for individual companies, of course, varies considerably from the average, due to their fabricating and other activities, which have nothing to do with the direct production of steel. Some interests calculate their "break-even" point, resulting strictly from steelmaking operations, as near 60 per cent of their ingot capacity.



proved stability will return to steelmaking.

Seemingly, producers could help to mitigate speculative buying by making price advances effective immediately, instead of permitting a lapse between the time of announcement and application. This arrangement, while desirable from the standpoint of the steelmaker, necescarily must overcome one large obstacle to become effective.

The mill taking the initiative in a price advance effective immediately obviously would be "out on a limb" unless it could be assured its competitors would follow suit immediately. This assurance could come only through a previous understanding among all producers that prices should be increased a certain amount on a specified date. And while such an agreement would not have disturbed the Blue Eagle a few years ago, it likely would be regarded as price-fixing and, consequently, anathema in the eyes of Washington today.

Heavy Industries at Disadvantage Under Merit Rating Tax Provisions

■ CAN STABILITY of employment and production be attained through incentive taxation, or tax credits for pursuing a course that otherwise might not be adopted?

When this relatively new concept of the tax power was explored before a senate finance subcommittee in Washington late last year, widely divergent views were revealed. Industrialists testifying before the committee were at a disadvantage in that no concrete proposal was at issue; they discussed only the principle, in the abstract, as it might apply to encouraging profit sharing.

Incentive taxation, however, is incorporated in most of the state unemployment compensation laws as merit rating provisions. Forty of the 51 jurisdictions (48 states, Hawaii, Alaska and the District of Columbia) have merit rating plans. Nine others (New York, Georgia, Hawaii, Maine, Massachusetts, Mississippi, North Carolina, Rhode Island and Virginia) provide for a study of merit rating; two (Maryland and Pennsylvania) have no references to such plans.

Laws with merit rating provide that after several years' experience becomes available, the rate for the tax on payrolls shall be adjusted in accordance with the experience of the individual firm. The theory is that if an employer maintains constant employment, thereby eliminating costs chargeable against the unemployment compensation fund, he is entitled to preferential treatment. If additional costs are incurred by the employer to maintain employment, it is contended that this should be taken into consideration in determining his tax rate.

Most Plans Not Yet Effective

In only one state (Wisconsin) has the law been in effect long enough to make merit rating effective. In most other states it will become effective in 1941 or 1942.

Not enough actual experience has been accumulated to judge the plan's effectiveness as an influence in employment stabilization. However, it already is obvious that merit rating can never bring about results that are absolutely equitable.

Some industries are normally stable, some normally unstable, some essentially seasonal. In some instances production and employment stabilization is relatively easy; in others, practically impossible.

Into the latter class, unfortunately, fall many of the metalworking and metal-producing industries. As long as cyclical variations in business activity occur, the durable goods industries will be at a distinct disadvantage in their efforts to stabilize production and employment, as compared with most consumers goods industries.

A soap manufacturer, if he has sufficient liquid capital, may be able to make his product for stock. The product is not so bulky as to make warehousing impractical, it is not likely to deteriorate, and is not subject to style or model change.

On the other hand, the manufacturers of steel products, machine tools or automobiles, will find one or more of these factors are barriers to production for stock. While consumers goods often are standard, durable goods generally are manufactured to specification.

Also to be considered is the financial position of the individual companies. Adequate liquid working capital is essential if production is to continue during periods of low demand.

Therein arises the objection that the merit rating plans benefit certain industries and certain companies at the expense of other industries and other companies.

How this would work may be illustrated by figuring the taxes of two hypothetical companies, A and B, in, say, Illinois in 1945, after the state's merit rating plan becomes fully effective.

Each company has an average annual payroll of $500,000. Company A manufactures men's suits to retail at $23. For this product there is a fairly steady demand in depression as well as in good times. Company B manufactures automotive parts, and demand for its product fluctuates from season to season and from year to year.

Penalizes Some Companies

By 1945, company A has built up an excess of tax contributions over benefit payments to disemployed workers of 12½ per cent or more of its annual payroll, and thereupon becomes exempt from contributions for the next year.

Company B has had a less favorable employment experience, caused by cyclical fluctuations in demand for its product. It has been forced to lay off employes frequently and consequently benefits to disemployed workers have caused its reserve to dwindle to nothing. Company B is liable for the maximum tax—3.6 per cent of payroll, or $18,000.

Since company B depends on orders from automotive builders, and since these vary seasonally and annually, fluctuations in its employment appear inevitable, unless automobile production is stabilized. There is little company B can do about it, however much it would

Merit Rating Plans in Principal Metalworking States

State	Effective date	Employer's Maximum tax	Employer's Minimum tax	Employe's contribution
		(All taxes in per cent of annual payroll)		
Alabama	1941	4	1.5	1
Ohio	1942	4	1	0
West Virginia	1941	2.7	0.9	0
Michigan	1942	4	1	0
Indiana	1939	3.7	0	0
Illinois	1942	3.6	0	0
Missouri	1942	2.7	0	0
Wisconsin	1938	4	0	0
California	1941	2.71	1	0.5 to 1

like to escape the additional unemployment tax.

For the seeming unfairness to companies and industries which normally lack stability, leaders in the metal producing and working industries generally regard this incentive tax with disfavor. In addition they regard it as one more case of governmental interference with management's policies, an abortive use of the taxing power, and a plan offering tremendous administrative difficulties, both for the company and for the government.

If the success of an employment plan is to be measured by the amount of unemployment it prevents rather than by the amount of benefits it pays, they agree the unemployment compensation laws are not the complete solution.

Private management has experimented with job or income assurance plans with varying success. Advent of the state unemployment compensation laws caused some of these to be discontinued.

General Electric Co. guaranteed to more than 6000 employes two-thirds their annual wage until the state unemployment compensation laws were passed. In 1936 the plan was discontinued.

More recently, General Motors Corp. announced its two benefit plans designed to level off the peaks and valleys of employment. It pointed out that this constituted an experiment.

Outside the metalworking field, several large companies have similar plans, including Procter & Gamble Co., William Wrigley Jr. Co., George A. Hormel & Co., and Nunn-Bush Shoe Co. Armstrong Cork Co. inaugurated a guaranteed income plan early this year.

UNEMPLOYMENT COMPENSATION BENEFITS $396,000,000

Payment of more than $26,000,000 in benefits during December brings the total paid to insured workers under state unemployment compensation laws during 1938 to more than $396,000,000, the social security board announced last week.

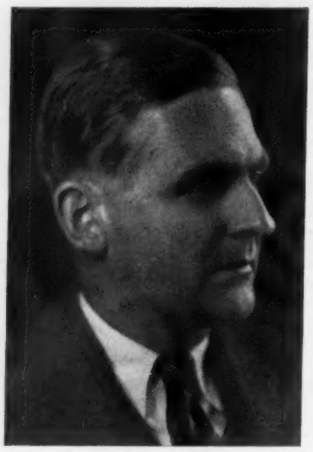
By the end of 1938, benefits were being paid in 31 states. Eighteen more jurisdictions started payment in January, 1939. In July, 1939, Illinois and Montana will reach the benefit-paying stage, making the unemployment compensation program established by the social security act effective throughout the union.

More than 63 per cent of the total benefits paid in 1938 were in California, Massachusetts, Michigan, New York and Pennsylvania. Michigan's benefit-paying program started in July, 1938, while California, Massachusetts, New York and Pennsylvania started payments approximately seven months earlier.

Evans, Central's Executive Head

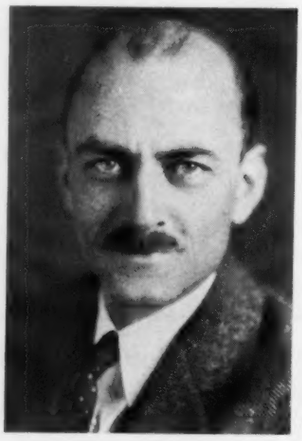
■ OWING to the recent death of Robert H. Irons, president, Central Iron & Steel Co., Harrisburg, Pa., the board of directors held a special meeting Feb. 6 for election of officers.

Vance C. McCormick, chairman, was elected chairman and president. Henry S. Evans, former general superintendent, was elected executive vice president and chief executive officer. He also was made a director and a member of the board's executive committee.



Henry S. Evans

Basil M. Graham, former comptroller, was elected secretary and treasurer, succeeding Donald McCormick, resigned. James E. Jones was elected assistant secretary and treasurer, retaining his position as credit manager.



Basil M. Graham

Mr. Evans, a graduate of University of Pennsylvania's school of engineering, formerly was associated with Cambria Steel Co., Johnstown, Pa. He went to Central in 1915 as superintendent of its large plate mill and later became superintendent of all mills. In 1923 he was appointed general superintendent in charge of operations.

Mr. Graham became associated with Central in 1922 as comptroller, and was elected a director in 1935.

Mr. Evans announced the appointment of Warren Elsey Jr., formerly assistant general superintendent, as general superintendent in charge of operations. A. E. Eck was named assistant general superintendent, with particular reference to engineering and maintenance.

Mr. Elsey before joining Central in 1927 was an operating superintendent with Jones & Laughlin Steel Corp., and later assistant general superintendent, Penn-Seaboard Steel Co.

Mr. Eck formerly was associated with the operating and engineering departments, Cambria Steel Co., Johnstown, and was later with the engineering department, Carnegie Steel Co. He went to Central in 1916 as chief draftsman and in 1925 became chief engineer.

Producers' Steel Stocks Advanced

■ PRODUCERS' stocks of ingots and semifinished steel at the close of 1938 were about 11 per cent higher than at the close of 1937, but were less than 2 per cent above tonnage Dec. 31, 1936, according to the American Iron and Steel institute's reports from a group of representative steel companies.

Iron ore stocks on docks or at blast furnaces Dec. 31, 1938, were 17 per cent below the preceding year. Coal at mine mouths and at plants was up 2.5 per cent. Inventories of purchased scrap declined 37 per cent during 1938, but stocks of pig iron increased 13 per cent.

Ferroalloy inventories increased 13 per cent. Tin supplies were 55 per cent higher; lead inventories increased 5 per cent, and zinc declined 12 per cent.

■ Shipments of oil burners in 1938 were 139,211, a decrease of 27.9 per cent from 193,180 in 1937, the commerce department reports. Orders at the end of 1938 were 139,320, against 192,854 at the close of 1937. December shipments totaled 8824, compared with 8239 in December, 1937. Stocks at the close of 1938 were 21,326 compared with 25,029 the preceding year.

Steel Capacity At Record High

■ ANNUAL capacity for producing steel ingots and steel for castings in the United States was increased in 1938 by 1,467,249 gross tons annually, and at the end of the year stood at 73,061,569 tons, the highest figure on record, according to the American Iron and Steel institute. This compares with 71,594,320 tons, as of Dec. 31, 1937, the increase being 2 per cent.

Capacity for ingots alone rose from 71,065,540 gross tons per year to 72,533,969 tons.

Most of the increase represented additional facilities for producing open-hearth steel, which advanced from 63,814,616 tons to 65,142,534 tons. Capacity in electric furnaces likewise increased, from 1,331,124 tons to 1,540,255 tons.

Bessemer capacity decreased slightly, from 6,440,000 tons to 6,374,000 tons, and crucible was reduced from 8580 tons to 4780 tons.

Coke pig iron capacity at the close of 1938 was 49,252,120 gross tons per year, a decline from 49,659,600 tons as of Dec. 31, 1937.

Charcoal pig iron capacity remained unchanged at 92,000 tons annually, and ferroalloys likewise remained unchanged at 946,800 tons.

JANUARY INGOT PRODUCTION SHOWS MODERATE INCREASE

Steel ingot production in January totaled 3,186,834 gross tons, at 52.69 per cent, based on the new capacity figures as of Dec. 31, 1938, computed by the American Iron and Steel institute. This compares with 3,143,169 tons in December, 53 per cent, and 1,732,764 tons in January last year, 29.15 per cent, both percentages based on capacity as of Dec. 31, 1937.

Except for November, 1938, January output was the largest for any month since October, 1937, when 3,392,924 tons were produced. With the exception of January, 1937, 4,718,436 tons, this was the largest January tonnage since 1930, when 3,778,235 tons were made. The all-time record for the initial month, 4,500,131 tons, was in 1929.

Calculated weekly production in January was 719,376 tons, compared with 711,124 tons in December, and 391,143 tons in January, 1938.

Production of steel ingots in fourth quarter was approximately 40 per cent above the output for the corresponding period of 1937, and about 27 per cent under last quarter production in 1936.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Feb. 11	Change	Same week 1938	Same week 1937
Pittsburgh ..	46	None	31	84
Chicago	51	+ 2.5	25	80
Eastern Pa...	36	+ 2	30	54.5
Youngstown..	44	+ 2	23	80
Wheeling	64	None	44	80
Cleveland ...	56.5	— 7.5	33	76.5
Buffalo	37	— 2.5	18.5	85
Birmingham..	80	None	61	76
New England.	70	None	27	88
Cincinnati ...	55	None	28	30
St. Louis....	50	+ 1.5	21	82
Detroit	94	+ 2	47	86
Average....	54	+ 1	30	81

Steel Ingot Statistics

Monthly Production—Complete for Bessemer; Open Hearth, Calculated from Reports of Companies Making 98.26 per cent in 1937

1939	—Open Hearth— Gross tons	Per cent of capacity	—Bessemer— Gross tons	Per cent of capacity	— Total — Gross tons	Per cent of capacity	Weekly production, all companies, gross tons	Number of weeks in month
Jan.....	3,039,340	55.19	147,494	27.24	3,186,834	52.69	719,376	4.43
1938								
Jan.....	1,632,773	30.25	99,991	18.27	1,732,764	29.15	391,143	4.43
Feb.....	1,578,233	32 38	125,493	25.40	1,703,726	31,74	425,931	4.00
March.....	1,854,669	34.36	157,737	28.83	2,012,406	33.85	454,268	4.43
April.....	1,793,522	34.31	131,644	24.84	1,925,166	33.44	448,757	4.29
May.....	1,676,215	31.06	130,590	23.87	1,806,805	30.39	407,857	4.43
June.....	1,519,589	29.07	118,688	22.40	1,638,277	28.46	381,883	4.29
July.....	1,854,076	34.43	127,982	23.44	1,982,058	33.42	448,429	4.42
Aug.....	2,350,199	43 54	196,789	35.97	2,546,988	42.85	574,941	4.43
Sept.....	2,449,861	46.98	207,887	39.32	2,657,748	46.28	620,969	4.28
Oct.....	2,894,726	53.63	223,208	40.79	3,117,934	52.45	703,823	4.43
Nov.....	3,370,974	64.50	201,246	37.98	3,572,220	62.05	832,685	4.29
Dec.....	2,984,204	55.42	158,965	29.12	3,143,169	53.00	711,124	4.42
Total	25,959,041	40.86	1,880,220	29.20	27,839,261	39.79	533,933	52.14

Percentages of capacity operated for 1939 are calculated on weekly capacities of 1,243,153 gross tons open-hearth ingots and 122,248 gross tons bessemer ingots; total, 1,365,401 gross tons; based on annual capacities as of Dec. 31, 1938, as follows: Open-hearth ingots, 64,817,994 gross tons; bessemer ingots, 6,374,000 gross tons.

Percentages of capacity operated for 1938 are calculated on weekly capacities of 1,218,342 gross tons of open-hearth ingots and 123,514 gross tons of bessemer ingots, total 1,341,856 gross tons; based on annual capacities as of Dec. 31, 1937, as follows: Open-hearth ingots, 63,524,356 gross tons; bessemer ingots, 6,440,000 gross tons.

PRODUCTION

■ STEELWORKS operations last week advanced in five districts, remained unchanged in five and declined in two. The national operating rate is estimated at 54 per cent, 1 point above the preceding week.

Youngstown, O.—Up 2 points to 44 per cent as Youngstown Sheet & Tube Co. aded two open hearths. Three bessemers and 38 open hearths are in operation. The same rate is scheduled for this week.

New England—For the fifth week production held at 70 per cent.

Cleveland — Down 7.5 points to 56.5 per cent, one producer taking off three open hearths. The same rate is scheduled this week.

St. Louis — Addition of an open hearth by one producer caused an increase of 1.5 points to 50 per cent.

Chicago — Advanced 2.5 points to 51 per cent, the highest since the first week of January.

Cincinnati—Steady at 55 per cent, keeping close to volume of bookings.

Birmingham, Ala. — Unchanged at 80 per cent, with 18 open hearths active.

Central eastern seaboard — Increase of 2 points to 36 per cent, with indications for no change this week.

Buffalo — Receded 2.5 points to 37 per cent as a leading producer dropped one open hearth.

Pittsburgh — Held at 46 per cent, with schedules for this week indicating a higher rate.

Wheeling—Continued 64 per cent, which has prevailed since the first week in January.

Detroit — Advanced 2 points to 94 per cent.

Shipments Up 13.7%

■ Shipments of finished steel by the United States Steel Corp. in January were 789,305 tons, an increase of 95,101 tons, 13.7 per cent, over December. This is the largest monthly total since October, 1937. In January, 1937, shipments were 1,149,918 tons.

U. S. STEEL CORP. SHIPMENTS

(Inter-company shipments not included)

(Tons)

	1939	1938	1937	1936
Jan.	789,305	518,322	1,149,918	721,414
Feb.	.... ..	474,723	1,133,724	676,315
March	.... ..	572,199	1,414,399	783,552
April	.... ..	501,972	1,343,644	979,907
May	.... ..	465,081	1,304,039	984,097
June	.... ..	478,057	1,268,550	886,065
July	.... ..	441,570	1,186,752	950,851
Aug.	.... ..	558,634	1,107,858	923,703
Sept.	.... ..	577,666	1,047,962	961,803
Oct.	.... ..	663,287	792,310	1,007,417
Nov.	.... ..	679,653	587,241	882,643
Dec.	.... ..	694,204	489,070	1,067,365
Adj.*	.... ..	.....	†77,113	†40,859
Total	.....	6,625,368	12,748,354	10,784,273

*Yearly adjustment. †Deduction.

"Be Loyal to Government, Make a Profit", Advice Given at Del Monte

DEL MONTE, CALIF.

■ BUSINESS prospects for 1939 are satisfactory and indicate a good volume at a fair profit, declared E. H. McGinnis, chairman, fifteeth annual conference, Iron, Steel and Allied Industries of the California state chamber of commerce, in opening the three-day meeting here last week. He urged all industry to "be loyal to the government and make a profit."

Dr. Paul F. Cadman, president, American Research Foundation, and San Francisco economist, condemned the philosophy that government can permanently provide relief and social security.

"These come," he said, "only from solvent industry and government. National income is not a fund but a process, and emerges continuously from operations of solvent enterprises.

"The important thing is to distinguish between gross and net national income.

"The flow of national income reaches the people through two great channels: One, industry paying out wages, interest and dividends; the other, government distributing wages to employes and through grants and bounties. But when a government is not satisfied with its 'take' and continues a policy of deficit financing, it moves positively toward bankruptcy."

Tells Warehouses' Function

A. Oram Fulton, Lovejoy & Co. Inc., Cambridge, Mass., and president, American Steel Warehouse association, told the conference warehouses handle about 14 per cent of all steel produced and serve more than 200,000 customers.

Discussing orders in the zone between those clearly "mill business" and others definitely "warehouse business," he pointed out factors which may determine whether they may be handled more efficiently by producer or distributor. In this field lie greatest possibilities for development of warehouse service, co-operating with the mill in distribution of items now handled by mills at excessive cost.

Small mill orders are doubtful luxury, he said. The minimum cost of entering an order is $4 to $5, roll changes average $60 each, and other costs accrue at every step. Scrap loss on small orders is excessive. Preparation of a small order for shipment often is as high as for a carload.

Much of this business which the steel producer handles at a loss, said Mr. Fulton, is desirable warehouse business and in the long run, if placed with the distributor, efficiency of mill and warehouse distribution would be so enhanced that the consumer would gain materially.

He suggested the mills make a thorough analysis of actual cost of securing, entering, processing and delivering orders of each type of commodity. With this determined the mill should set up a price structure to cover actual cost, plus a reasonable profit. This may be in the form of quantity extras on a sliding scale for each product.

B. J. Osborne, Moore Drydock Co., Oakland, Calif., was elected chairman for the coming year. Mr. McGinnis, Union Hardware & Metal Co., Los Angeles, was named vice chairman, and C. S. Knight, California state chamber of commerce, secretary.

Udylite Corp. Formed; Acquires Bright Nickel

■ All capital stock of Bright Nickel Corp., Detroit, owner of the basic Schlotter patents covering the bright nickel plating process, has been acquired by the newly formed Udylite Corp., Detroit.

Preceding this, the Udylite Co. set up a new organization known as the Udylite Corp. which has taken over all business and assets of the Udylite Co. The latter has been known widely as one of the leading plating and polishing supply and equipment interests in the metal-finishing field.

Bright Nickel Corp. will be operated as a wholly owned subsidiary of Udylite Corp. Personnel, management, and policies of the latter will remain the same as those of its predecessor. Officers of the new corporation are Charles Awkermann, chairman; L. K. Lindahl, president; C. H. Reeme, vice president, and Horace Maynard, secretary.

Through this acquisition the new company is in position to offer the metal-finishing industry a more complete range of products and processes, increased technical and research facilities, and an organization equipped to handle greater variety of metal finishing problems.

■ Orders for fabricated steel plates in December were 28,218 tons, compared with 20,213 tons in November and 27,463 tons in December, 1937, commerce department reports. Total for 1938 was 285,061 tons; in 1937, 428,884 tons.

Elevated Highway, According to Industrial Designer

■ **That elevated highways will solve many traffic problems—and require large tonnages of steel—is well understood by engineers. They have submitted many designs for such structures in prize competitions. Now the industrial designers—the fellows who make things beautiful, from air compressors to household ironers—are busy with creative ideas for elevated highways. This design by Wilbur Henry Adams, Cleveland, leaves the steel construction of parabolic arches exposed, in the sketch, "to reveal the sheer strength and beauty of it"**

Steady Increase In Shipbuilding

■ STEADILY increasing volume of shipwork was indicated by J. Lewis Luckenbach, president, American Bureau of Shipping, at the seventy-seventh annual meeting of the bureau's board of managers and members in New York.

On Jan. 1, 149 vessels of 583,830 gross tons were being built to the bureau's classification, compared with 92 vessels of 283,830 tons at the beginning of 1938. Since Jan. 1 additional orders for approximately 90,000 tons have been placed. On Feb. 1, 177 ships aggregating 667,980 gross tons were under construction, compared with 91 vessels a year ago.

Ships under construction at the beginning of the year included 16 large tankers, 32 freight vessels for the United States maritime commission, three passenger-cargo vessels for the Panama Railroad Co., three passenger-cargo ships for the Mississippi Shipping Co., four cargo vessels for the American Export Lines, and one large passenger vessel for the United States Lines.

Welding More Widely Used

Mr. Luckenbach outlined trends in ship construction and equipment, spoke of the greater application of welding, commented on certain advantageous uses of the special steels, particularly on the Great Lakes, and stressed the need for legislation to make maritime shipping more attractive to capital.

"Welding," he declared, "is being more and more widely adopted in every branch of ship and engine building. In this connection, I might say that in 1928, the bureau classed 52 vessels under 300 feet long, only one of which was all-welded. Last year out of 156 vessels under 300 feet, no fewer than 136, or 87 per cent, were all-welded.

Mr. Luckenbach said that while welding developments in the larger ships had been less spectacular, there is no ocean-going vessel of any type being built today which can properly be termed all-riveted.

Commenting on practice on the Great Lakes, Mr. Luckenbach said special steels having high resistance to damage through impact without a sacrifice of weldability are coming into use for tank tops and other parts receiving continual abuse from bulk cargo and handling apparatus.

■ Producers of secondary nonferrous metals and alloys and of nonferrous metal products reported increased employment, wages and value of products in 1937, compared with 1935, in the biennial census of manufactures, census bureau. Employes in 1937 numbered 87,989, an increase of 31.9 per cent over 66,697 in 1935; wages at $121,397,341 were 60.5 per cent greater than $75,610,479; value of products, $782,380,891 was 71.6 per cent over $455,849,715.

Sees Substantial Gain for Electrical Manufacturers

■ An increase of as much as 25 per cent in business of the electrical manufacturing industry this year was predicted at the National Electrical Manufacturers' association's meeting in New York last week, by Carl L. Pierce Jr., its president.

"Many factors point to better business for the industry in 1939," he said. "Residential building is increasing, the desire for living electrically is more widespread, demand for electric service is growing, and utility modernization and expansion is continuing.

"The research laboratories of our members have been especially active and each day sees some new development. New generating and transmission facilities will be added by the defense program. Replacement sales of appliances have been increasing."

Morrow Predicts Further Development in South

■ Industrial development in the South has been greater since 1880 than in any other section on a comparative basis, said Hugh Morrow, president, Sloss Sheffield Steel & Iron Co., Birmingham, Ala.

Mr. Morrow addressed the annual meeting of the Engineers' Society of Western Pennsylvania in Pittsburgh, Feb. 6. J. L. Perry, president, Carnegie-Illinois Steel Corp., was toastmaster.

The South's development will continue, according to Mr. Morrow, as long as political influences are left out of the picture. He declared the country's economic trouble is not in the South—or any other section—but in Washington.

Retarding the South, said the speaker, are still remnants of post-Civil war days, including discriminatory freight rates.

Continuous Mill Planned By Steel Co. of Canada

■ Steel Co. of Canada Ltd., Hamilton, Ont., by recent action of stockholders, has authorized directors to raise capital for construction of a continuous strip mill, to cost about $10,000,000, by issuing bonds, debentures or other securities. This will be the first continuous mill in Canada and one of the few outside the United States. One was completed recently for Richard Thomas & Co., Ebbw Vale, England.

In preparation for this development Steel Co. of Canada in 1937 purchased from United Engineering & Foundry Co., Pittsburgh, a 44-inch blooming mill, a duplicate of the new blooming mill of Republic Steel Corp. at Cleveland and of Richard Thomas & Co. at Ebbw Vale.

Drums That Beat the Flames

■ **Twenty-six welded steel drums, like that in center, returning empty from Oklahoma to Monsanto Chemical Co., Monsanto, Ill., after delivery of mixed acid, went through a fire in which the car carrying them was destroyed. The heat expanded the drums, as shown, the stress reducing the steel from 12 gage to 30 gage, without rupture. Welded joints and bung fittings remained intact. Photo, Monsanto**

800 Firms Contribute to Aircraft; Expect $200,000,000 Output in '39

■ MORE than 800 companies now build aircraft or supply components to builders. Included are 90 firms producing complete airplanes; 30 making engines; 35, propellers; 40, instruments. The other 625 manufacture accessories, raw and fabricated materials, wholly or in part for aircraft.

In addition, some 375 machinery builders supply the plane and parts-makers with production equipment such as tools, heat treating furnaces, materials handling systems.

The aircraft industry itself is estimated to have approximately $75,000,000 invested in plant and equipment. Its factories currently employ nearly 40,000 persons, pay them $60,000,000 annually. In 1934 shop workers totaled only 13,000.

Production last year aggregated $140,000,000, comprising 3700 planes, about 6000 engines, spare parts and accessories. Many observers predict output for 1939 will approach $200,000,000. This is based on projected national defense appropriations, regular army and navy programs, existing order backlogs, and anticipated commercial and export business.

Payrolls of leading constructors have been showing impressive gains. At close of January, Glenn L. Martin Co., Baltimore, had increased employment to 4128, fifth successive monthly high. Five thousand are expected to be at work this year.

Douglas Aircraft Co., Santa Monica, Calif., also speeding up assemblies, lately added 1000 employes. Lockheed Aircraft Corp., Burbank, Calif., last month took on 600, bringing its total to 3581, which exceeds the preceding year by 79 per cent. At North American Aviation Inc.'s Inglewood, Calif., plant, record activity has 3200 men working two shifts.

Influence Broadening

That this industry's influence is broadening is evidenced in attention given it by such allied fields as the automotive. Alison Engineering division of General Motors, Packard Motor Car Co., and Continental Motors Corp., alike are building aircraft engines.

The latter company also has organized Continental Aeronautic Corp. in Burbank, Calif., to make metal plane parts. Willys-Overland interests recently formed American Helicopter Corp. and are expected to produce autogyro craft. (STEEL, Jan. 30, p.24.)

Plant expansion is continuing. Latest announcement is from National Aircraft Corp., Ft. Worth, Tex. President A. P. Barrett is taking bids on construction of a 160 x 350-foot factory costing nearly $100,000.

The British air ministry last week contracted for an additional 200 North American Aviation training planes costing $8,000,000, and 50 Lockheed observation ships amounting to about $5,000,000. United Aircraft Corp., East Hartford, Conn., is to supply 200 engines and 200 propellers for the trainers at $1,500,000. With its backlog now at $35,000,000, Lockheed is scheduling 1939 output to triple last year's.

Other recent awards: United States coast guard, three patrol amphibians costing $204,000, to Grumman Aircraft Engineering Corp., Bethpage, L. I.; Northwest Airlines Inc., six 21-passenger transports costing $860,000, to the Douglas company; and Brazilian government, 15 planes costing $225,000, to Waco Aircraft Co., Troy, O.

The President's national defense program, involving large increases in the air force, moved a step nearer enactment last week when the house military affairs committee unanimously reported a $376,000,000 bill authorizing purchase of 3000 fighting planes for the army.

Consumers' Net Profit 29 Per Cent of 1937

■ TOTAL net income of 25 companies among equipment manufacturers, suppliers and other leading iron and steel consumers last year aggregated $14,754,616 or 29 per cent of the $50,754,464 net profit reported by the identical companies in 1937. Eight of the 25 companies reported a loss last year, whereas only one had a loss in 1937. In the following tabulation all figures are net income, except where asterisk denotes loss.

	1938	1937
Ferry Cap & Set Screw Co., Cleveland	76,763*	117,394
Savage Arms Corp., New York	60,434	455,616
Foote Bros. Gear & Hobbing Machine Corp., Chicago	72,465*	171,300
A. M. Castle & Co., Chicago	216,406	958,932
Transue & Williams Steel Forging Corp., Alliance, O.	194,636*	90,195
Michigan Steel Tube Products Co., Detroit	62,724*	429,778
American Steel Foundries, Chicago	1,750,235*	3,617,761
Pittsburgh Coke & Iron Co., Pittsburgh	216,773	806,728
Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.	9,052,773	20,126,408
American Brake Shoe & Foundry Co., New York	1,080,719	3,410,798
General Railway Signal Co., Rochester, N. Y.	133,352*	645,150
J. G. Brill Co., Philadelphia	133,565*	541,593
Niles-Bement-Pond Co., Hartford, Conn.	844,000	1,290,884
Vogt Mfg. Co., Louisville, Ky.	170,694	346,948
Cleveland Hobbing Machine Co., Cleveland	30,892	116,569
General Iron Works Co., Denver	12,614	20,100
L. C. Smith & Corona Typewriters Inc., Syracuse, N. Y.	209,486	200,613
Chicago Electric Mfg. Co., Chicago	40,552	103,396
Harbison-Walker Refractories Co., Pittsburgh	737,762	3,131,595
Landis Machine Co., Waynesboro, Pa.	59,218	98,624
Minneapolis-Honeywell Regulator Co., Minneapolis	1,003,289	2,929,249
Viking Pump Co., Cedar Falls, Iowa	182,366	323,657
Bliss & Laughlin Inc., Harvey, Ill.	52,062	659,881
Fostoria Pressed Steel Corp., Fostoria, O.	27,393*	7,394*
Caterpillar Tractor Co., Peoria, Ill.	3,235,709	10,168,689

Steel Founders Study Problems, Outlook

■ Management and salesmanship must go hand in hand to achieve success, declared Claude L. Harrell, Sterling Steel Casting Co., East St. Louis, Ill., speaking before the Steel Founders' Society of America in Chicago, Feb. 8 and 9.

"There are many factors which depend upon the management in order to make efficient selling possible," said Mr. Harrell. "It does not matter how efficient a sales force a business has, if the management does not do its part. . . . All guess work and chance must be eliminated from management and salesmanship."

Other speakers scheduled and their topics included: Chauncey Belknap, the group's counsel, on "The Steel Foundryman, His Society and the Law"; Gus W. Dyer, Vanderbilt university, on "Government and Business"; A. M. Andorn, Penn Steel Castings Co., Chester, Pa., "The Economic Outlook as it Appears to Me"; Judge R. V. Fletcher, general counsel, Association of American Railroads, "A Railroad Lawyer Looks at Business."

At the technical session, Charles W. Briggs, the society's technical adviser, presented "Some Data on the Fluidity of Cast Metals" and K. V. Wheeler, Lebanon Steel Foundry, Lebanon, Pa., "Design Factors Affecting Steel Casting Production."

■ Caterpillar Tractor Co., Peoria, Ill., has issued its second annual report to 10,000 employes and 18,000 shareholders. The 1938 report has been elaborated through use of color, charts, drawings and figures to clarify the corporation's operations.

MEETINGS

CHANGE DATES FOR MILL SUPPLY CRUISE TO BERMUDA

■ TRIPLE convention cruise to Bermuda arranged by the American Supply and Machinery Manufacturers' association, National Supply and Machinery Distributors' association and Southern Supply and Machinery Distributors' association, and originally scheduled for May 17-23, has been changed to May 25-June 1. The cruise will be on the MONARCH OF BERMUDA instead of the S. S. BREMEN. Reservations are to be made direct to H. H. Allen, Thomas Cook & Son, 587 Fifth avenue, New York. The ship will have accommodations for 840 convention delegates, more than half of which already have been engaged.

The convention program, now being arranged, will include separate and joint sessions of the three associations, and entertainment features.

PITTSBURGH TRAFFIC MEN IN SILVER ANNIVERSARY

Traffic and Transportation Association of Pittsburgh will celebrate its silver anniversary year at its twenty-fifth annual dinner at the William Penn hotel, Pittsburgh, Feb. 16. John B. Kennedy, radio commentator and associate editor of *Collier's Weekly*, will be the principal speaker. Charles Donley, traffic counselor, is to be toastmaster.

Convention Calendar

Feb. 13-16—American Institute of Mining and Metallurgical Engineers. 150th meeting at Engineering Societies building, New York. A. B. Parsons, 29 West Thirty-ninth street, New York, is secretary.

Feb. 15-17—American Management association. Midwinter conference of personnel division at the Palmer House, Chicago. Alvin E. Dodd, 330 West Forty-second street, New York, is president.

Feb. 16-17—American Foundrymen's association. Second regional conference of Wisconsin chapter and University of Wisconsin at Hotel Schroeder, Milwaukee.

Feb. 23-25—American Society of Mechanical Engineers. Spring meeting at St. Charles hotel, New Orleans. C. E. Davies, 29 West Thirty-ninth street, New York, is secretary.

Feb. 23-25—American Foundrymen's association. Regional conference of Birmingham chapter at Hotel Tutwiler. Birmingham, Ala.

March 5-13—Leipzig Trade Fair. Spring session in Leipzig, Germany. Leipzig Trade Fair Inc., 10 East Fortieth street, New York, is American representative.

March 7-10 — American Road Builders' association. Thirty-sixth annual convention and show in Civic Auditorium, San Francisco. Charles M. Upham, 914 National Press building, Washington, is managing director.

March 8—American Society for Testing Materials. Regional meeting at Deshler-Wallick hotel, Columbus, O., in conjunction with spring group meetings of committees, March 6-10. C. L. Warwick, 260 South Broad street, Philadelphia, is secretary.

March 8-10—International Acetylene association. Thirty-ninth annual convention at Rice hotel, Houston, Tex. H. F. Reinhard, 30 East Forty-second street, New York, is secretary.

March 13-15 — National Association of Waste Material Dealers. Annual meeting at Sherman hotel, Chicago. Charles M. Haskins, 1109 Times building, New York, is secretary.

March 13-18—American Society of Tool Engineers. Second annual convention and exposition at Convention Hall, Detroit. Ford R. Lamb, 2567 West Grand boulevard, Detroit, is executive secretary.

March 15—National Industrial Advertisers' association. Eastern regional meeting in Newark, N. J.

Brothers Work for One Company; Total 422 Years

■ **A remarkable industrial service record is held by these three Delage and seven Dumas brothers who have worked a total of 422 years for American Optical Co., Southbridge, Mass. They are representative of skilled workers employed for long periods of time. The company says: "It can be seen we do not believe workers are through when they reach the age of 40"**

Activities of Steel Users, Makers

■ WHEELING STEEL CORP., Wheeling, W. Va., has purchased the Atlas Supply Co., Muskogee, Okla., distributor of oil country supplies. This company operates 16 stores in the oil fields of Oklahoma, Kansas and Texas. No change in company policy is contemplated by the Wheeling organization, and the management of Atlas will remain under the direction of J. H. McDonald, president.

♦

Rustless Iron & Steel Corp., Baltimore, has moved its Cleveland district sales office to larger quarters at 707 Society for Savings building.

♦

J. H. Williams & Co., maker of drop forgings and drop forged tools, has moved its New York office from 75 Spring street, to 225 Lafayette street.

♦

Van Norman Machine Tool Co., Springfield, Mass., has appointed Marshall & Huschart Machinery Co., Chicago, exclusive representative in the Chicago territory for its line of machine tools.

♦

Conners Steel Co. Inc., Birmingham, Ala., and Knoxville Iron Works, Knoxville, Tenn., have recently installed top-charged electric furnaces of 3-ton per hour capacity, supplied by Pittsburgh Lectromelt Furnace Corp.

♦

Mechanical goods division, Baltimore branch, United States Rubber Co., New York, which heretofore has functioned under supervision of the Philadelphia branch, is now being operated independently, with R. F. Jackson as manager of mechanical sales.

♦

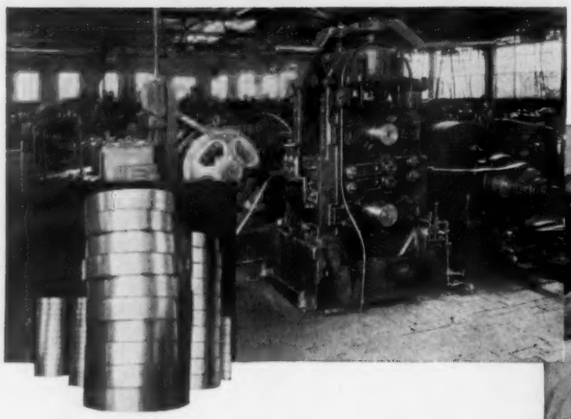
Thomas Truck & Caster Co., Keokuk, Iowa, has purchased the business of William H. Sipple Corp., South Bend, Ind., maker of floor trucks, industrial trailers, truck casters and conveyors. The line will be combined with Thomas products and all production will be at Keokuk..

♦

Allegheny-Ludlum Steel Corp. is now occupying its new Detroit district offices and warehouse at Wanda and Jarvis avenues, Ferndale, Mich. Monitor-type warehouse, 84 x 200 feet, is provided, as well as a two-story office building, 36 x 84 feet. Complete stocks of tool steel will be carried. H. N. Arbuthnot is manager; Harry I. Askew, assistant manager.

when it comes to Spring Steel and Steel Springs

avail yourself of the facilities of the Complete Springmaker



SPRING STEEL made by the Wallace Barnes Company specifically for use in springs; having ductility, hardening properties, and high fatigue properties which are the result of years of research.

TOOLS designed and built for the fabrication of spring steel into accurate parts with the minimum of tool maintenance and low unit cost.

HEAT TREATMENT based on years of research, with ultra-modern equipment, and experience in the handling of spring steel and knowledge of spring requirements.

THESE FACILITIES, either separate or in combination, plus expert engineering advice, are available to users of spring steel or heat treated spring steel parts of any description.

Wallace Barnes Company, Bristol, Conn.

DIVISION OF ASSOCIATED SPRING CORPORATION

Ask for your free copy of the Handbook of Spring Information giving engineering and practical information on springs and spring materials

Windows of WASHINGTON

By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

■ MAINTAINING its usual secrecy the federal trade commission has refused to make any statement regarding its testimony dealing with the steel industry to be presented to the national economic committee Feb. 24 through 28.

Not only do commission officials refuse to discuss how it will proceed, but the names of its own witnesses will be announced only 24 hours before they go on the witness stand.

It is reported details of the steel presentation have not yet been entirely worked out. Serious thought is being given to the idea, it is understood, that the commission may present its case through witnesses subpenaed from the steel industry itself.

It is reliably reported here that the commission may put some of its economists on the stand to discuss the whole steel industry situation, but commission officials also are considering subpenaing steel industry witnesses.

Considering the attitude of the federal trade commission toward the steel industry and toward the basing point system, what the commission experts may tell the national economic committee should be interesting.

BURKE OFFERS AMENDMENTS TO LABOR RELATIONS ACT

Senator Edward R. Burke, Nebraska, New Deal opponent and national labor relations board critic, last week proposed to the senate a series of amendments to the Wagner labor act.

The senator said his amendments would make "the present one-sided act fair to all citizens." He proposed to curtail drastically the powers of the labor relations board and reconstitute it with one respresentative each of employes, employers and the public.

Burke charged the board has "abused its judicial powers" and that all three of its present members are "organized labor partisans."

HOPKINS MAY DEFINE POLICIES AT DES MOINES

More than usual interest attaches to an address which will be made by Secretary of Commerce Harry L. Hopkins before the Des Moines Economic Club in Des Moines, Iowa, Feb. 24. The secretary will discuss government and business, and in accordance with statements which he has made at his press conferences since he became a member of the cabinet, he intends to enunciate his policies for the department. This is the first public speech that Mr. Hopkins has scheduled since he was appointed secretary of commerce.

DEFENSE BILL APPROVED BY MILITARY AFFAIRS COMMITTEE

House military affairs committee last week approved the $376,000,000 defense bill asked by the President, Bill authorizes over 3000 additional planes for the army and provides for additional officers and for the strengthening of defenses at the Panama Canal. This is the first of the bills designed to carry out the President's recommendation for a $552,000,000 rearmament program.

Among other things the bill authorizes $300,000,000 for additional airplanes, increasing the army's fleet from 2320 to 5500 planes. The bill provides for increased personnel and gives authority to the secretary of war to lend planes and equipment to aviation schools to train and provide instructors for expansion of the air force.

Also included is an authorization of some $23,000,000 for the strengthening of antiaircraft, seacoast and other defenses at the Panama Canal. The bill also provides expenditure of $32,500,000 immediately for the placement of educational orders and extends for four more years the act of last year which calls for an annual expenditure of $2,000,000 for these educational orders.

In reporting out the independent offices appropriation bill the house committee on appropriations set forth some interesting facts on ships and airplanes.

Committee approved the request of the maritime commission for contract authorizations for ship construction amounting to $230,000,000 which with $115,000,000 authorized in one of the deficiency bills for the present fiscal year totals $345,000,000 for ship contractual obligations. The actual commitment beyond 1940 totals approximately $184,000,000.

The house committee's approval of the $100,000,000 replenishment to the construction fund takes account of $33,000,000 which will be carried over from 1939, making the total budget estimates approved by the house committee approximately $133,000,000. Ship construction expenditures for 1940 show an increase of $65,000,000 over 1939 due to the construction program becoming effective.

This is the first time the maritime commission has asked congress for any appropriations, its requirements having been supplied by funds and other assets transferred to it in 1936 by the United States Shipping Board Merchant Fleet Corp.

Plan 50 Ships a Year

The house committee states the program of ship construction for rehabilitating the merchant marine is well in hand, 51 ships having been contracted for in the year ended Dec. 31, 1938, and the program contemplates contracting for approximately 50 additional vessels each year.

During the fiscal year 1939, the maritime commission entered into operating subsidy contracts with 14 companies, covering the operation of 161 vessels in essential foreign trade routes, and by 1940 will have under subsidy 230 such vessels for approximately 1246 voyages per year

that are engaged in foreign commerce.

The committee also provided an appropriation of $21,000,000 for the civil aeronautics authority, an increase of $6,500,000 above funds actually available for 1939.

Appropriation was also made by the house committee for the national advisory committee for aeronautics amounting to $1,740,000.

Dealing with the activities of the advisory committee, the house committee reports:

"Recent events have demonstrated the dominance of air power in international affairs. The effectiveness of an air arm, however large, is dependent upon constant progress in the engineering science of aeronautics.

"Recently the aeronautical research activities of foreign powers have been greatly accelerated with resulting improvement in their military aircraft. In order to make possible the development by our army and navy of aircraft at least equal in performance with those of any other nation the United States must place greater emphasis on aeronautical research.

Get $240,000 More for Research

"The national advisory committee for aeronautics supplies to the military establishments and to the aircraft industry the research information and scientific data on which the development of American military aircraft is based. This agency also undertakes the solution of fundamental problems in aeronautics for the civil aeronautics authority to promote safety and efficiency in our civil and military aircraft. This agency, by co-ordinating the research needs of aviation, military and civil, prevents overlapping and duplication of effort.

"In order to meet the increased demands of the military establishments for aeronautical research information it is necessary for the national advisory committee for aeronautics to enlarge its staff and to procure additional equipment for its laboratories at Langley Field, Va. The bill provides the budget estimate of funds totaling $1,740,000, compared with a total for 1939 of $1,700,000, an increase of $40,000. The appropriation for 1939 included $200,000 for a building-construction item making a net increase of $240,000 for aeronautical research."

ICC REJECTS PROPOSED FREIGHT RATE INCREASE

A proposal of railroads to increase freight rates on iron and steel to intermediate points between middle western points of origin and Duluth, St. Paul and Minneapolis last week was rejected by the interstate commerce commission. The railroads sought relief under the interstate commerce act to raise the intermediate rates while maintaining depressed rates between the origins and farthest destinations.

The railroads had contended in seeking to restore a normal basis for rates from and to intermediate points they were complying with the commission's admonition in recent rate increase cases to the effect that roads should review their rates and wherever possible increase subnormal rates to proper basis.

SENATE REBUKES PRESIDENT BY REJECTING NOMINEE

President Roosevelt certainly must realize by now that he will have an impossible situation to handle in congress if he suggests any radical legislation.

If he had any illusions about a coalition between Old Line Democrats and Republicans, he certainly must have been disillusioned last week when the senate rejected his selection of Judge Roberts for a place on the federal bench in Virginia. This is said to be the first time in history that the nomination by a President for any position has been turned down by any such majority, and even strong administration backers voted against the appointment of Judge Roberts. The judge was opposed by the two Democratic senators from Virginia, Glass and Byrd, who had raised the traditional senatorial objection that the appointment was "obnoxious" to them.

CIO PUTS IN A WORD FOR LABOR RELATIONS BOARD

Lee Pressman, general counsel for CIO, has sent a letter to members of congress telling of the opposition of that organization to any attempts to cut appropriations of the national labor relations board or to put any restrictions on the use of these funds.

The letter urged the full appropriation of $3,230,000 for the board and warned against attempts to amend the labor relations act indirectly by tying strings to the appropriation. The letter read:

"We wish to express our very firm opposition to any reduction in the appropriation of $3,230,000 for the national labor relations board contained in the independent offices appropriations bill as introduced and to any legislative restrictions on the use of these funds.

"Amendments to the national labor relations act should be considered, if at all, in connection with bills introduced in the usual manner and after public hearings. To cripple the board by cutting its funds or to amend the act indirectly by tying strings to the appropriation would be an unworthy method of dealing with the crucial issues now before congress relating to the act."

STRATEGIC RAW MATERIALS BILL IS INTRODUCED

A composite bill was introduced in the senate last week on behalf of Senators Miller, Arkansas, Wheeler and Murray, Montana, Ashurst, Arizona, George, Georgia, and McCarran, Nevada, which provides for the acquisition of strategic and critical raw materials, concentrates and alloys.

It provides for the purchasing through the procurement division of the treasury department of these so-called strategic materials to be made under the so-called buy American act. The bill provides an appropriation of $25,000,000 for 1940, 1941, 1942, and 1943.

STEEL NATIONALIZATION BILL AGAIN PROPOSED

Representative Burdick, North Dakota, has introduced a bill in the house to provide for the acquisition by the federal government and "the public ownership and operation of the iron and steel industry of the United States." This bill is identical with the one introduced at the last session by former Representative Teigan, Minnesota.

Provision is made for the organization under the act of a corporate body to be known as the national iron and steel board of nine members. Of these members, four would represent the workers in the iron and steel industry, while the remaining five would represent the people of the United States, and would be appointed by the President.

WALSH-HEALEY IRON, STEEL PURCHASES TOTAL $517,613

For the week ended Feb. 4, the government purchased $517,613.11 worth of iron, steel and their products under the Walsh-Healey act as follows: Atlantic Metal Products, Inc. Long Island city, N. Y., $18,969.20; United States Pipe & Foundry Co., Chicago, $34,453.88; Florence Pipe Foundry & Machine Co., Philadelphia, $42,400; New England Electric Co., Denver, $39,423; Bethlehem Steel Co., San Francisco, $44,370; Commercial Shearing & Stamping Co., Youngstown, O., $28,000; Worden-Allen Co., Chicago, $21,160.53; Scully Steel Products Co., Chicago, $13,523.12; Lukens Steel Co., Coatesville, Pa., $21,565.20; Riley Stoker Corp., Worcester, Mass., $23,000; Carnegie-Illinois Steel Corp., Boston, $85,720.25; Bethlehem Steel Co., Bethlehem, Pa., $10,078.23; The Sause Structural Steel Co., Youngstown, O., $19,925; National Malleable & Steel Castings Co., Cleveland, $99,242; and Northill Co. Inc., Los Angeles, $15,782.70.

Steel Products for Sale Down 45%

■ STEEL products made for sale in 1938 amounted to 20,993,315 gross tons, compared with 37,945,108 tons in 1937, a decline of 44.67 per cent, according to the American Iron and Steel institute. Figures were compiled from reports of 164 companies, practically the entire industry. The total for 1938 represents 70.6 per cent of ingots produced by these companies. In 1937 total was 70.5 per cent of ingot production.

Of the tonnage for sale in 1938, 1,460,121 tons were for export and 1,925,103 were shipped to members of the industry for further conversion into finished products. Products for sale, less shipments to members of the industry, were 19,068,212 tons, representing 39.6 per cent of finishing capacity. In 1937 the total, less shipments to members of the industry for conversion, was 34,236,748 tons, 72.6 per cent of finishing capacity.

In fourth quarter of 1938 production for sale was 6,961,157 tons. Exports were 402,572 tons and shipments for conversion 732,536 tons, leaving for sale 6,228,621 tons, representing 51.7 per cent of finishing capacity. This compares with 5,443,694 tons, or 46.1 per cent of capacity in fourth quarter, 1937.

Pig iron produced for sale, including ferromanganese and spiegeleisen, last year totaled 3,049,290 tons, of which 472,472 tons were shipped to members and 406,485 tons exported. For entire year 1937, pig iron produced for sale totaled 6,542,321 tons, of which 393,545 tons were exported and 1,679,892 tons were shipped to members of the industry.

AMERICAN IRON AND STEEL INSTITUTE
Capacity and Production for Sale of Iron and Steel Products

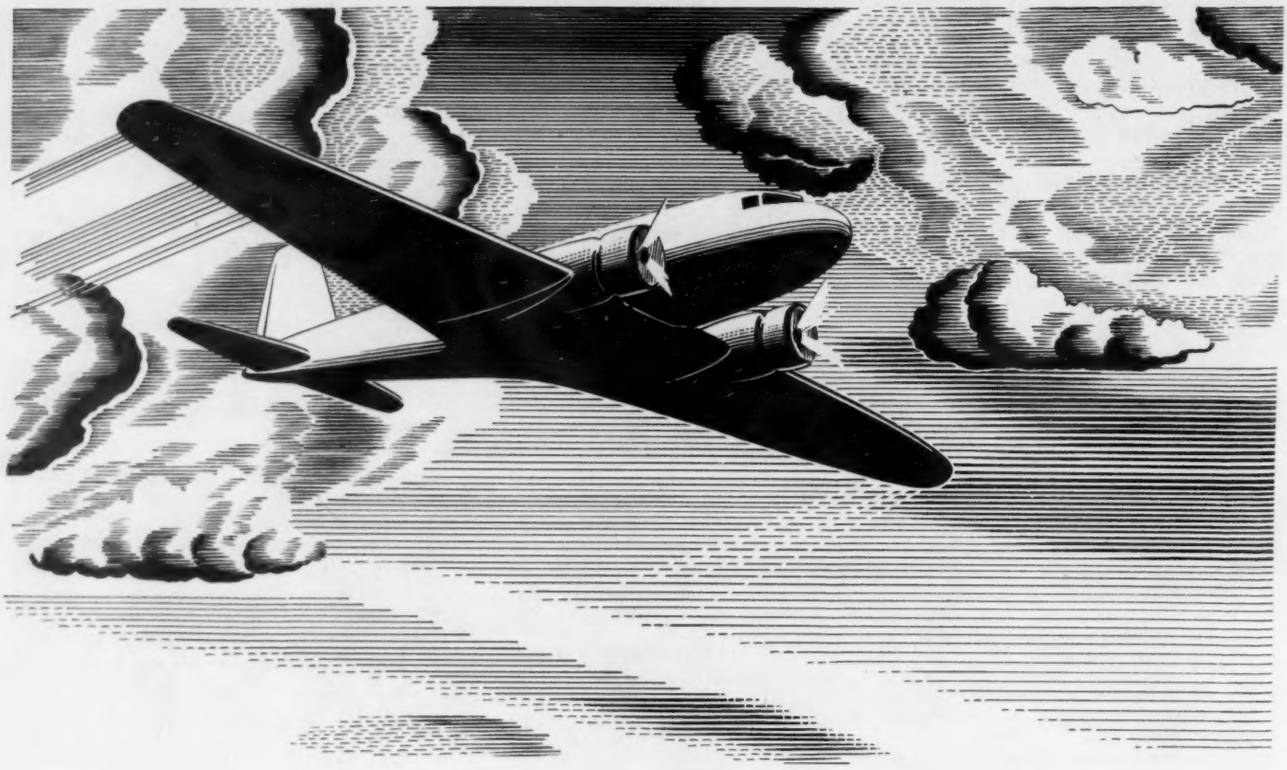
Fourth Quarter - 1938
PERIOD

		Number of companies	Items	Annual Capacity Gross tons	Production for Sale—Gross Tons: Current Quarter: Total	Current Quarter: Per cent of capacity	Current Quarter: Shipments: Export	Current Quarter: Shipments: To members of the industry for conversion into further finished products	To Date (12 Months 1938): Total	To Date: Per Cent of capacity	To Date: Shipments: Export	To Date: Shipments: To members of the industry for conversion into further finished products
Steel Products	Ingots, blooms, billets, slabs, sheet bars, etc.	29	1	xxxxxxx	620,840	xxx	24,722	412,044	1,708,067	xxx	141,716	1,030,546
	Heavy structural shapes	8	2	4,657,100	394,547	33.9	16,394	-	1,387,204	29.8	71,700	xxxxxxx
	Steel piling	3	3	234,500	37,655	64.2	3,239	-	114,764	48.9	6,025	xxxxxxx
	Plates—Sheared and Universal	20	4	5,992,710	451,510	30.1	43,268	2,981	1,457,588	24.3	130,448	7,380
	Skelp	6	5	xxxxxxx	133,329	xxx	39,497	52,561	394,977	xxx	55,066	216,125
	Rails—Standard (over 60 lbs.)	4	6	3,395,000	86,902	10.2	11,286	-	552,355	16.3	27,261	xxxxxxx
	Light (60 lbs. and under)	6	7	436,500	15,107	13.8	1,565	-	42,806	9.8	6,100	xxxxxxx
	All other (Incl. girder, guard, etc.)	2	8	105,000	3,450	13.1	167	-	16,915	16.1	4,760	xxxxxxx
	Splice bar and tie plates	14	9	1,310,050	29,174	8.9	1,409	-	196,753	15.0	3,831	xxxxxxx
	Bars—Merchant	37	10	xxxxxxx	616,014	xxx	17,698	58,248	1,755,157	xxx	90,242	187,062
	Concrete reinforcing—New billet	15	11	xxxxxxx	182,062	xxx	13,056	-	623,769	xxx	39,186	xxxxxxx
	Rerolling	18	12	xxxxxxx	34,368	xxx	1,957	-	122,663	xxx	8,354	xxxxxxx
	Cold finished—Carbon	19	13	xxxxxxx	103,154	xxx	1,415	-	275,876	xxx	6,169	xxxxxxx
	Alloy—Hot rolled	14	14	xxxxxxx	156,259	xxx	4,684	10,639	357,354	xxx	13,485	33,660
	Cold finished	14	15	xxxxxxx	13,458	xxx	105	-	32,918	xxx	622	xxxxxxx
	Hoops and baling bands	5	16	xxxxxxx	11,430	xxx	259	-	51,789	xxx	1,408	xxxxxxx
	TOTAL BARS	55	17	11,547,859	1,116,745	38.7	39,174	68,887	3,219,526	27.9	159,466	220,722
	Tool steel bars (rolled and forged)	15	18	94,150	5,073	21.6	775	-	16,541	17.6	1,251	xxxxxxx
	Pipe and tube—B. W.	16	19	1,771,779	164,855	37.2	6,978	-	539,190	30.4	20,933	xxxxxxx
	L. W.	11	20	1,428,380	60,297	16.9	1,976	-	270,921	19.0	10,839	xxxxxxx
	Electric weld	4	21	614,000	30,678	20.0	1,069	-	132,929	21.6	9,640	xxxxxxx
	Seamless	15	22	2,942,900	323,982	44.0	14,839	-	1,111,923	37.8	73,269	xxxxxxx
	Conduit	7	23	158,720	10,112	25.5	172	-	38,371	24.2	1,383	xxxxxxx
	Mechanical Tubing	5	24	182,300	20,833	45.7	1,220	-	59,421	32.6	4,459	xxxxxxx
	Wire rods	19	25	xxxxxxx	151,669	xxx	2,921	52,288	412,316	xxx	22,410	148,959
	Wire—Drawn	38	26	1,967,370	263,417	53.6	17,088	2,800	811,936	41.3	52,110	9,244
	Nails and staples	19	27	1,078,572	127,597	47.3	9,044	-	437,613	40.6	27,169	xxxxxxx
	Barbed and twisted	16	28	425,477	28,979	27.2	12,618	-	130,349	30.6	35,630	xxxxxxx
	Woven wire fence	15	29	711,825	36,799	20.7	324	-	167,423	23.5	1,320	xxxxxxx
	Bale ties	11	30	110,677	5,888	21.3	42	-	37,323	33.7	296	xxxxxxx
	All other wire products	5	31	29,000	2,290	31.6	2	-	4,871	16.8	8	xxxxxxx
	Fence posts	14	32	147,100	8,329	22.6	101	-	40,957	27.8	926	xxxxxxx
	Black plate	12	33	503,015	60,743	48.3	1,675	24,670	262,589	52.2	7,281	92,282
	Tin plate—Hot rolled	11	34	1,631,956	118,392	29.0	16,835	-	603,344	37.0	136,612	xxxxxxx
	Cold reduced	10	35	1,828,100	255,892	56.0	19,771	-	841,582	46.0	69,790	xxxxxxx
	Sheets—Hot rolled		36	xxxxxxx	921,053	xxx	35,098	67,428	2,163,219	xxx	124,873	93,324
	Hot rolled annealed	25	37	xxxxxxx								
	Galvanized	16	38	xxxxxxx	272,426	xxx	24,349	-	889,387	xxx	83,137	xxxxxxx
	Cold rolled	19	39	xxxxxxx	525,966	xxx	36,151	-	1,199,844	xxx	97,822	xxxxxxx
	All other	15	40	xxxxxxx	92,899	xxx	4,362	-	254,965	xxx	13,580	xxxxxxx
	TOTAL SHEETS	26	41	10,504,353	1,812,344	69.0	99,960	67,428	4,507,415	42.9	319,412	93,324
	Strip—Hot rolled	25	42	3,223,200	383,762	47.6	7,754	48,877	934,227	29.0	33,613	106,541
	Cold rolled	37	43	1,178,961	159,870	54.2	3,219	-	382,856	32.5	10,504	xxxxxxx
	Wheels (car, rolled steel)	5	44	380,319	15,653	16.5	107	-	57,978	15.2	2,594	xxxxxxx
	Axles	5	45	425,900	10,800	10.1	2,808	-	40,515	9.5	10,045	xxxxxxx
	Track spikes	11	46	302,350	12,386	16.4	553	-	52,411	17.3	2,206	xxxxxxx
	All other	5	47	26,657	1,267	19.0	-	-	7,359	27.6	48	xxxxxxx
	TOTAL STEEL PRODUCTS	141	48	xxxxxxx	6,961,157	xxx	402,572	732,536	20,993,315	xxx	1,460,121	1,925,103
	Estimated total steel finishing capacity based on a yield from ingots of 70.6%	-	49	48,152,500	xxxxxxx	51.7	xxxxx	xxxxxxx	xxxxxxx	39.6	xxxxxxx	xxxxxxx
	Pig iron, ferro manganese and spiegel	29	50	xxxxxxx	889,335	xxx	76,915	207,168	3,049,290	xxx	406,485	472,472
	Ingot moulds	4	51	xxxxxxx	78,843	xxx	2,530	-	176,926	xxx	6,930	xxxxxxx
Iron Products	Bars	12	52	230,519	5,755	10.0	6	238	16,951	7.4	317	320
	Pipe and tubes	4	53	185,457	7,318	15.8	150	-	26,394	14.2	524	xxxxxx1
	All other	2	54	63,560	1,481	9.3	101	240	6,797	10.7	407	2,184
	TOTAL IRON PRODUCTS (ITEMS 52 to 54)	14	55	421,576	14,554	13.8	257	478	50,142	11.9	1,248	2,504

Total Companies included - 164

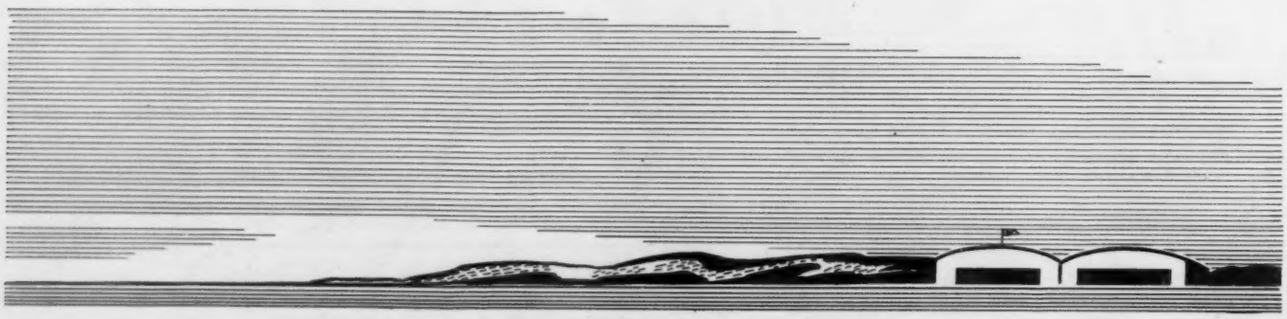
Total steel products produced for sale, less shipments to members of the industry for conversion into further finished products: Current quarter 6,228,621 G.T.; 51.7 % of Finishing Capacity.
To date 19,068,212 G.T.; 39.6 % of Finishing Capacity.
The above tonnages represent 70.6 % of the ingots produced by companies whose products are included above.

REACHING AN OBJECTIVE

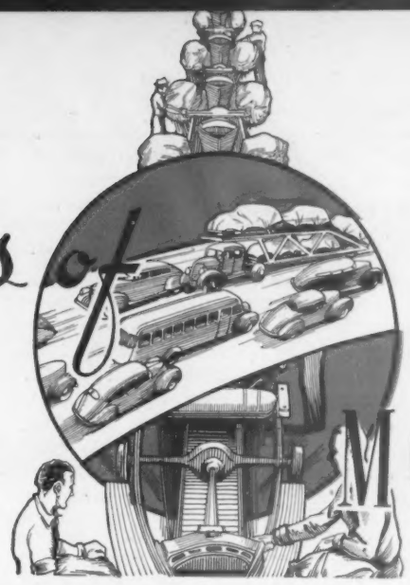


Year after Year, manufacturers of flying equipment set New Objectives. Today, we have Speed, Sustained flight, Greater Economy of Operation, and Greater Reliability of Equipment at Lower Cost. » » Bullard Machines —Mult-Au-Matics and Vertical Turret Lathes—are a contributing factor in improved Aeroplane Motors. » » Higher Speeds, Reliability, and Long Life of motors under gruelling service are dependent on extremes of Accuracy in their working parts. » » Bullard Machines have proved their Reliability in continuously producing Aeroplane engine parts to required specifications at an economical cost. » » Whether you have Aeroplane Engine work or what (?)—Let Bullard Engineers recommend the best type of machine for your job and submit production and cost estimates. » » When you need the machines, you'll want them in a hurry. Get the ball rolling NOW. Rustle up those jobs and ask Bullard NOW— "How shall we do them?"

THE BULLARD COMPANY
BRIDGEPORT CONNECTICUT



Mirrors of MOTORDOM



By A. H. ALLEN
Detroit Editor, STEEL

Material appearing in this department is fully protected by copyright, and its use in any form whatsoever without permission is prohibited.

DETROIT

■ GASOLINE engines have held the automotive power plant field pretty much to themselves since the days of the first automobile. Experiments with other forms of fuel have been numerous but have failed to take hold perceptibly, with the possible exception of the diesel which now appears to be winning an important position in the commercial vehicle field.

Within the past few years research work has been undertaken on the use of another type of fuel for internal combustion engines—liquefied hydrocarbons stored under pressure and gasified as they are inducted to combustion chambers through mixers and pressure relief valves. Particularly on the West coast has this form of fuel come into favor and today there are a number of large western truck fleets powered with butane and propane.

A local engineer, David E. Anderson, formerly with Bohn Aluminum & Brass Corp. and now associated with Holley Carburetor Co., has been interested in this development and has spent considerable time in perfecting equipment to convert conventional gasoline engines into butane engines. He has also devoted much time to contacting fleet operators on the Pacific coast who are using butane, and personally drove a butane-powered truck on a transcontinental test run, subjecting it to all sorts of climatic and road conditions.

Mr. Anderson became interested in the work in connection with efforts to overcome the adverse distribution of fuel and air in conventional engines. Tests have shown that in a gasoline engine the ratio of fuel to air from cylinder to cylinder will vary as much as 8 points, while with butane and propane this variation is brought down to 1 or less. The investigation led into such phases as design of manifolds and cylinder heads, study of compression ratios and the like, and from it evolved a special type of aluminum alloy manifold with inbuilt mixer and pressure regulators which can be applied to a gasoline engine to permit the use of butane and propane fuel.

Butane and propane, of course, are gases at atmospheric temperatures and pressures, but under pressure, varying according to temperature, become liquid, and it is in this form that the fuel is carried in the automobile or truck. The arrangement used on a number of trucks, such as the one pictured below, is to have a couple of 50-gallon steel tanks, of considerably heavier gage than conventional gasoline tanks (⅛ to 5/32-inch), which store the fuel under about 150 pounds pressure. High-pressure pipelines lead to the mixer attached to the manifold, the mixer comprising two pressure

✦

■ **Butane tanks of heavy-gage steel as installed on one of a fleet of interstate trucks (lower left) operated on the West coast. Lower right shows a typical butane dispensing station operated by a western oil company. Note two hoses on the pump stand, one for injecting fuel under pressure, other for removing vapor from tank as it is being filled. At center is shown aluminum alloy manifold surmounted by two-stage pressure regulator and mixer for converting gasoline engine to butane-propane fuel. This is the latest design in which refrigerating action of the expanding fuel is used to chill the manifold, improving volumetric efficiency**

regulators, the first bringing the pressure down to about 10 pounds per square inch and the second to just below atmospheric pressure, whereupon it is mixed with a certain proportion of air and allowed to pass through the manifold to intake valves.

In reducing the pressure there is naturally a considerable refrigerating action or heat absorption, the expansion of a liquid gas being the principle of most refrigeration equipment. Use is made of this cooling effect in Anderson's equipment to chill the manifold, thus permitting a more concentrated gas to be introduced into the cylinders.

Some research has been devoted to the use of this refrigerating action to cool the load on a refrigerator truck; however, it is believed there is not sufficient cooling action developed in the fuel expansion to refrigerate even a small truck without supplementary icing equipment, so it has proved more economical to concentrate the chilling effect on the manifold. One of the illustrations shows a complete jacketed manifold and mixer developed for a butane installation.

Use Higher Compression Ratios

For various reasons, the fuel usually used is a mixture of butane and propane which tests about 21,000 B.t.u. per pound, compared with 19,000 for gasoline. However, the B.t.u. per cubic foot rating of butane-propane is 2970, compared with 5000 for gasoline, which indicates why it is advisable to chill the manifold and also to use higher compression ratios in the engine to make most advantageous use of it.

A typical butane-propane mixture is 31.22 propane, 31.92 normal butane and 36.94 per cent isobutane. Specific gravity is in the approximate ratio of 4 pounds of butane-propane equivalent to 6 pounds of gasoline.

As shown in an illustration, butane is dispensed at conventional service stations operated by oil companies on the West coast, the only difference being that two hose lines must be connected to the truck's tank when the latter is being filled. One delivers the liquid fuel under pressure, the other pumps off the vapor in the tank above the fuel level. Cost on a gallon basis is about 2 to 3 in favor of butane. Over and above the advantages of far better distribution of fuel in cylinders, use of butane fuel is reported to eliminate carbon deposits in cylinders and to overcome oil dilution in crankcases. Additional equipment required to convert a gasoline engine to butane would average about $35 per installation on a volume basis, although individual conversions have cost from $75 to $200. High-compression pistons, altered cylinder head design and a more positive ignition system are some further requirements.

Liquid hydrocarbon fuel in pressure tanks has been used to some extent in foreign motor cars, particularly in Germany, where the practice is to charge the liquid fuel in steel bottles which, when empty, are replaced by new filled bottles. Inasmuch as it appears perfectly feasible to dispense the fuel from service stations through pressure connection to the storage tank on the car or truck, it is not likely the replaceable bottles will find much favor in this country.

Some West coast operators are reported to have switched from diesel engines to butane fuel, because of difficulties with the former engines from the standpoint of excessive maintenance and obnoxious fumes, especially when under heavy load. The diesel is known to be an ideal engine when running at a constant speed and constant load, but sudden shifts in the load on the engine such as occasioned by encountering a sharp grade often result in enrichening mixtures to such a degree that clouds of black smoke are belched out through exhaust pipes.

Availability of butane and propane for motor fuel is a matter on which oil companies show some disagreement. A large volume of these liquefied gases is used in industrial heating and heat treating furnaces. Some also is used for heating and power in rural areas. One authority recently estimated the volume of propane and butane available in the United States during 1936 as follows: From natural gases, eight billion gallons; from distillation of crude oil, 1½ billion; and from cracked gases 4.5 billion. Another engineer is of the opinion that demands from other industries, including aviation, make it appear butane and propane cannot be made available for motor fuel.

While on the subject of new motor fuels, mention might be made of a patent recently granted to one R. I. Cummings of Ypsilanti, Mich., on a new type of motor powered by liquid carbon dioxide, liquid air or liquid oxygen. The motor is said to be similar in construction to the steam engine, having two cylinders. The inventor is planning to build a large-size unit and install it in an automobile to see if it will live up to his belief that $4 worth of liquid carbon dioxide in a single refillable tank will propel the car 5000 miles.

Automobile Production

Passenger Cars and Trucks—United States and Canada

By Department of Commerce

	1936	1937	1938
Jan.	377,244	399,186	227,130
Feb.	300,810	383,900	202,589
March	438,943	519,022	238,598
April	527,625	553,231	238,133
May	480,518	540,377	210,183
June	469,368	521,153	189,399
July	451,206	456,909	150,444
Aug.	275,934	405,072	96,936
Sept.	139,820	175,630	89,623
Oct.	230,049	337,979	215,296
Nov.	405,799	376,629	390,350
Dec.	518,958	347,349	407,016
Year	4,616,274	5,016,437	2,655,777

Estimated by *Ward's Reports*

Week ended:	1939	1938†
Jan. 14	86,925	65,735
Jan. 21	90,205	65,418
Jan. 28	89,200	59,365
Feb. 4	79,410	51,443
Feb. 11	84,500	57,810

†Comparable week.

	Week Ended Feb. 11	Feb. 4
General Motors	34,065	33,865
Chrysler	20,645	15,820
Ford	21,750	21,750
All others	8,040	7,975

■ DIE programs for 1940 models are being unveiled quietly, somewhat ahead of the expected release date of Feb. 15. Within the last two weeks Buick is understood to have released both front and rear fender dies for new models, and they are reported to embody complete changes from present lines.

Foundries in this district are currently figuring on a number of other die programs, including considerable Chevrolet work, and inquiries are being received by some of the scrap interests locally for moderate tonnages of cast material for foundry melting.

Plans are being drawn up for introduction of the new Hupp Skylark about April 1, and with RFC funds now available a fair amount of material and parts is anticipated for this account any day now.

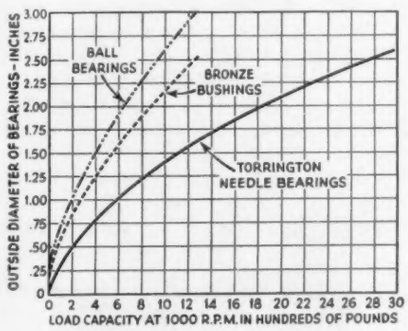
■ NEW design of steel wheel used by Packard this year, with slots equally spaced around the rim, has been found to permit quick application of tire chains, a lifesaver for many marooned here in the recent blizzard. Tire chains were thought to be almost things of the past around here, and in the recent heavy weather stores sold out their entire supplies in a few hours. . . . Retail sales for Hudson in the four weeks ended Jan. 28 were 29 per cent over the same period a year ago. . . . Chevrolet sold 51,966 new cars and trucks in January, 31.7 per cent over January, 1938. . . . Buick January sales, at 12,977, broke all records for this month in the history of the company.

COMPARE THE DIMENSIONS

of the TORRINGTON Needle Bearing

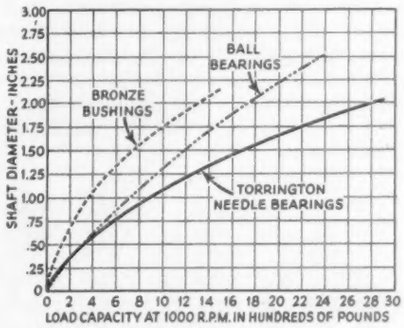
COMPARE from these graphs the outside diameters of the Torrington Needle Bearing with those of ball bearings and bronze bushings for comparable loads. Note the relatively small diameter of the Needle Bearing, and consider its space-saving advantages in your own products.

Note, too, the smaller shaft diameters needed to carry a given load with the Needle Bearing. These smaller dimensions mean savings in space, weight, and cost of surrounding members. Similar savings result at other operating speeds.



NOTE: Bronze Bushings to have same overall dimensions as Needle Bearings

Moreover, the Needle Bearing allows additional savings because it permits the simplification of housing design. The bearing is a single compact unit, easily pressed into place in the simplest type of housing.



NOTE: Bronze Bushings to have same overall dimensions as Needle Bearings

A properly machined bore in the housing serves to mount the bearing.

Lubrication is Thorough

Lubrication of the Needle Bearing is efficient and thorough. The hardened outer retaining shell is provided with turned-in lips that hold ample quantities of oil or grease for long periods of operation without renewal. The rotation of the needles constantly provides lubricant for the rotating shaft. And all of these advantages are obtained in a bearing surprisingly low in both purchase price and assembly cost.

Why not secure these advantages in your own product? The Torrington Engineering Department will cooperate with you in laying out applications. For further information, write for Catalog No. 10. For Needle Bearings to be used in heavier service, request Circular X from our associate, Bantam Bearings Corporation, South Bend, Ind.

The Torrington Company
ESTABLISHED 1866
Torrington, Conn., U.S.A.

Makers of Ball and Needle Bearings

Branch Offices in all Principal Cities

TORRINGTON NEEDLE BEARING

MEN OF INDUSTRY

■ GEORGE W. HAUCK, associated with Crane Co., Chicago, for about 26 years, and since October, 1937, department manager at the Chicago works, has been made manager of the engineering sales section, valve and fitting department. Mr. Hauck is a frequent contributor to technical publications on engineering topics, particularly relating to piping problems.

♦

E. Clay Howell has been elected vice president and general manager, Haven Malleable Castings Co., Cincinnati.

♦

Norvin H. Green has been elected a director, International Business Machines Corp., New York, to fill the vacancy due to the death of Erskine Hewitt.

♦

George S. Denithorne has resigned as district sales representative of Medart Co., St. Louis, to devote his time to practice as consulting engineer, State College, Pa.

♦

Oliver H. Edwards, associated with Joseph Honhorst Co., Cincinnati, the past 20 years, as general manager and superintendent, has become affiliated with Cincinnati Butchers Supply Co., Cincinnati, in charge of its new sheet steel plate and light structural iron department.

♦

V. J. Lajeunesse, formerly assistant manager of illuminating laboratory and lighting sales for General Electric Co., has been appointed manager of lighting sales for Union Metal Mfg. Co., Canton, O.

♦

John S. Dean, well known transportation maintenance engineer, has retired from Westinghouse Electric & Mfg. Co. after 36 years of service.

John S. Dean

Mr. Dean has written and published several books, among them "The ABC of the Electric Car" and "Therapeutics of Railway Equipment."

♦

Elmer C. Kiekhaefer, until recently chief engineer, Stearns Magnetic Mfg. Co., is now associated with the Kiekhaefer Corp., Cedarburg, Wis., as vice president in charge of engineering.

♦

George F. Wales, the past 15 years chief engineer of American Radiator Co.'s stamping plant, Buffalo, has resigned, to devote his time to industrial product design and the management of the Strippit Corp., of which he is president and founder.

♦

W. Bruce Ogden, recently named general sales manager, Valley Mould & Iron Co., Hubbard, O., has been elected vice president. Prior to joining the company 14 years ago, he was associated with Pickands, Mather & Co., Arthur G. McKee & Co., Brier Hill Steel Co. and Republic Steel Corp.

♦

L. A. Delaney, the past five years superintendent and material supervisor, Baldwin-Southwark Corp., subsidiary of Baldwin Locomotive Works, has been appointed mill superintendent, William B. Scaife & Sons Co., Oakmont, Pa., succeeding Charles E. Neudorfer, who has been named to the newly created post of chief engineer of the mill.

Other changes in the Scaife company personnel include: Eugene S. Sedlachek, formerly manager, water purification departments, as general sales manager of ranges, boilers, special tanks, cylinders, and domestic water softeners and filters. Floyd E. Thelen succeeds John M. Green who returns to the home office after serving six years as manager of the Chicago branch.

♦

Harry H. Weining has been placed in charge of all research projects concerned with the Copes system of boiler feed control and allied equipment for Northern Equipment Co., Erie, Pa. He joined the company in June, 1926, following graduation from Pennsylvania State college. Assisting Mr. Weining will be Francis W. Bunting and William E. Veenschoten.

♦

Paul W. Keating, a partner in the firm of Davee, Koehnlein & Keating, has been appointed director of publicity, Porcelain Enamel institute, Chicago. Ken M. Davee, of that organization, will also be associated with the institute's research and publicity work.

Dr. Paul L. Smith, national bureau of standards, Washington, has been reappointed for 1939 as research associate of the Porcelain Enamel institute.

♦

Max Schlossberg, M. S. Kaplan Co., Chicago, has been re-elected president, Chicago chapter, Institute of Scrap Iron and Steel Inc. H. S. Lewis, Price Iron & Steel Co., Chicago, has been elected first vice president; A. J. Clonick, Clonick Steel Co., Chicago, second vice president; Frank Parker, Iron & Steel Products Inc., Chicago, third vice president; Harvey Kaplan, M. S. Kaplan Co., secretary; Henry Rosenthal, Briggs & Turivas, Blue Island, Ill., treasurer.

♦

H. S. Washburn, president, Plainville Casting Co., Plainville, Conn., and L. N. Shannon, vice president, Stockham Pipe Fittings Co., Birmingham, Ala., have been nominated for president and vice president, respectively, American Foundrymen's association, Chicago. Directors nominated to serve three

E. S. Sedlachek

L. A. Delaney

years include: Marshall Post, president, A. F. A., and vice president, Birdsboro Steel Foundry & Machine Co., Birdsboro, Pa.; W. G. Coleman, secretary, metropolitan Philadelphia chapter, A. F. A., and president, W. B. Coleman Co., Philadelphia; C. R. Culling, vice president, Carondelet Foundry Co., St. Louis; Fred J. Walls, metallurgical engineer, International Nickel Co., Detroit; Otto A. Pfaff, vice president, American Foundry Equipment Co., Mishawaka, Ind.

♦

R. E. Greenwood has been appointed district sales manager at Chicago for the American Chain division of American Chain & Cable

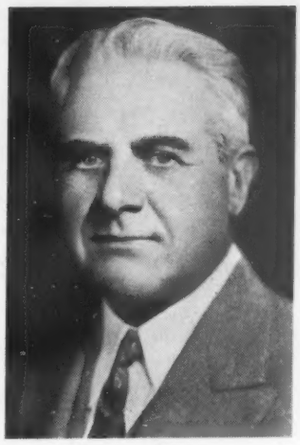
R. E. Greenwood

R. C. Brenizer

Co. Inc., with headquarters at 400 West Madison street. He succeeds G. B. Kutz, who has been transferred to York, Pa., as assistant to the general manager of sales, American Chain division. R. C. Brenizer succeeds Mr. Greenwood as Philadelphia district sales manager, with headquarters at Second and Diamond streets.

♦

Samuel A. Jackson, manager, and George McIlveen, assistant manager, were guests of honor at a testimonial dinner given by employes of the Park works of Crucible Steel Co. of America, at the Fort Pitt hotel, Pittsburgh, Jan. 28. Walter McLaughlin was toastmaster. Short talks were made by A. L. Sonnhalter, vice president of Crucible Steel and manager of the Pittsburgh Crucible Steel Co., Midland; Clarence Wise, manager, LaBelle works, and others. Movies of the various Crucible mills were shown.



Thomas Drever
Recently elected president, American Steel Foundries, Chicago, as reported in STEEL, Jan. 23, page 19

♦

Frederick W. Copeland has resigned from the presidency of H. Channon Co., Chicago, to become president, Sullivan Machinery Co., Michigan City, Ind. Mr. Copeland was previously affiliated with the Sullivan company, having joined the organization in 1913. In the ensuing 21 years he worked successively as apprentice, serviceman in the mines, salesman, export manager, vice president and controller. He has been a director since 1923. In 1934 he left to become president of the Channon Co.

The following new directors have been elected: H. T. Walsh, J. W. Haddock, W. R. Jarvis and L. T. Noel.

♦

L. B. McCully has been named manager, transportation and generator division, Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa. He succeeds F. H. Stohr who becomes manager of the company's industry sales department. Mr. McCully enrolled in the company's apprentice course in 1916, following which he was assigned to a machining department as a production clerk. In 1927 he was made assistant superintendent of production for the entire East Pittsburgh works; two years later was appointed head of production; in 1935 was promoted to assistant superintendent, generator division; and since May 1, 1936, had been superintendent of that division.

R. A. Neal has been named assistant to vice president; C. F. Lloyd has been appointed manager, central station sales department, and W. A. Furst has been appointed coordinator of navy and maritime activities.

DIED:

■ JAMES McALEAR, president, McAlear Mfg. Co., Chicago, maker of automatic valves, pressure and level control specialties, in that city, Jan. 5. A graduate of Purdue university, he was with B. F. Sturtevant Co. for some years before starting out as a consulting engineer. He organized the McAlear company in 1916.

♦

William H. Sellew, 63, well known for researches in railroad engineering, Jan. 29 at Ann Arbor, Mich.

♦

Louis F. Picker, 61, vice president, Advance Tool & Die Co., Milwaukee, Feb. 4.

♦

James M. Triner, president, Triner Scale & Mfg. Co., Chicago, in Chicago, Jan. 21.

♦

John J. Serrell, 49, since 1912 a partner in the mechanical engineering firm of Smith & Serrell, Newark, N. J., Jan. 12 in Philadelphia.

♦

Allen E. Ostrander, 62, assistant vice president, American Car & Foundry Co., New York, in that city recently.

♦

R. C. Lanphier, 61, president, Sangamo Electric Co., Springfield, Ill., maker of electric meters and precision instruments, Jan. 29 in that city.

♦

Wilfred Strong, 65, treasurer, Kalamazoo Foundry & Machine Co., Kalamazoo, Mich., in that city, Jan. 25. He had been with the company 35 years.

♦

William Hyink Sr., 75, founder and president, William Hyink & Sons Co., Milwaukee, builder of machinery, and engaged in general machine shop business, Feb. 6.

♦

Wallace D. Walker, 51, president, Talon Inc., Meadville, Pa., Feb. 4 in that city. He was eastern sales manager, with headquarters in New York, until 1933, when he went to Meadville as vice president.

♦

W. E. Lewis, 68, resident manager for six years of the Addyston works, Cincinnati, United States Pipe & Foundry Co., Feb. 5. He was associated with the company 45 years, part of the time as resident manager of the Anniston, Ala., foundry.

Editorial

Informed Workers Do Not Impede Progress

■ "LABOR SAVING" is a term that has not been used much in industry in the last few years when referring to labor-saving methods and equipment. Instead, such methods and equipment have been described as "relieving men of fatigue" and as "making workers more efficient." These softer terms are calculated to be less offensive.

And yet, nobody concerned is fooled for a moment. "Efficient utilization" of high-unit-cost labor means only one thing. That is greater production with the existing payroll or equal production with a reduced payroll. It means more work produced per man.

This is not something new. It has been a continuing feature in the progress of industry. By this process production costs have been lowered so as to enable the average citizen to buy more products of industry out of his income. It is the process that has permitted the wide enjoyment of automobiles, radios, electric refrigerators, tractors and hundreds of other products. The trend toward greater production efficiency must continue if industry is to continue to elevate the living standards of an increasing number of our citizens.

Labor Welcomes Improved Methods When It Understands Benefits

The necessity for improved efficiency is resented by workers only when they are not properly informed. Many managements know from experience that their men welcome the installation of improved methods and equipment when they understand that the improvements are needed to protect or improve the company's competitive position. The average worker is highly interested in working for a sound company that is able to provide maximum employment at desirable wages.

Even organized labor, which on many occasions in the past has discouraged improvements in efficiency, of late has shown a disposition to appreciate this fundamental economic need.

One of these manifestations, as described in *Forbes* for Dec. 15, 1938, occurred late last November, when representatives of the American Federation of Hosiery Workers (CIO) signed new contracts with the Gotham Silk Hosiery Co. affecting 4000 workers. In these contracts, drawn for three years instead of the usual one, the union urges the management to install new machinery so as to keep the mills operating at peak efficiency. The union and the company agree "to work co-operatively to obtain the highest possible efficiency of operation in all mill departments."

Steady Work, Good Pay, Recognition Are the Workers' Basic Demands

Fundamentally, this matter of improved efficiency is close to the heart of the industrial relations problem. It abounds in hazards for misunderstandings—for when a man fears that an improvement program may eliminate or curtail his job he tends toward emotional instability. At a time when both good industrial relations and greater efficiency are of paramount importance, wise management will take every precaution to minimize this hazard.

Much progress has been made throughout industry toward better relations between management and employes. Some companies have developed a technique which insures thorough understanding and co-operation. Many still are groping for an effective system, making their approach by the time-honored cut-and-try method.

The average worker wants continuity of employment, the best possible rate of pay, personal recognition. Industrial relations, to be successful, must be aimed at these three fundamental desires.

The BUSINESS TREND

Activity Index Drifts To Lower Levels

■ SEASONAL tendencies combined with severe winter storms forced a decline of 2.2 points in STEEL's index of activity in the iron, steel and metalworking industries, for the week ended Feb. 4. The index now stands at 90.7, against 92.9 in the week ended Jan. 28. This also compares with the 1938 high of 100.7 in the week ended Dec. 10 and with a level of 70.9 at this time last year.

Steelmaking operations recorded an encouraging gain of 1.5 points to 53 per cent in the week ended Feb. 4, after remaining substantially unchanged throughout January. The national steel rate is now at the highest level since Dec. 17, when it stood at 58 per cent. Still further increase in this important industrial indicator is anticipated in the week ended Feb. 11. However, no substantial improvement in the steel rate is expected until March. The combined increased seasonal demand from automotive, farm equipment and construction industries should lift the national rate above the 60 per cent level during the spring months.

Reflecting to a considerable degree the inability of automobile parts suppliers to make normal deliveries because of severe winter weather, automobile assemblies declined 9790 units to 79,410 in the week ended Feb.

STEEL INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE (STEEL). AVERAGE FOR 1926 EQUALS 100 WEIGHTED AS FOLLOWS: STEEL RATE 40, AND CARLOADINGS, POWER OUTPUT AND AUTO ASSEMBLIES EACH 20
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS
COPYRIGHT 1939 STEEL
PER CENT
125 120 115 110 105 100 95 90 85 80 75 70 65 60 55 50 45 40 0
1929 1930 1931 1932 1933 1934 1935 1936 1937 1938 1939
JAN FEB MAR APR MAY JUNE JULY AUG SEPT OCT NOV DEC
1938
1939

STEEL'S index of activity declined 2.2 points to 90.7 per cent in the week ended Feb. 4:

Week ending	1938	1937	1936	1935	1934	1933	1932	1931	1930	1929
Nov. 19	100.4	84.9	109.9	90.9	55.2	52.6	49.2	54.8	71.0	87.8
Nov. 26	93.9	72.7	105.2	86.0	54.4	55.4	44.5	51.4	66.9	80.9
Dec. 3	100.1	81.5	108.4	91.7	51.9	49 7	45.3	52.9	69.2	85.0
Dec. 10	100.7	80.5	113.9	91.8	56.8	52.6	46.6	53.1	68.2	83.4
Dec. 17	99.8	79.4	114.8	91.9	60.6	56.0	49.3	52.3	67.3	79.7
Dec. 24	94.8	69.5	93.3	77.3	64.4	58.0	46.9	46.8	52.3	64.9
Dec. 31	79.9	62.7	96.6	78.2	60.8	53.7	42.9	48.8	58.5	74.3
1939	**1938**	**1937**	**1936**	**1935**	**1934**	**1933**	**1932**	**1931**	**1930**	**1929**
Jan. 7	86.5	70.1	107.8	90.2	65.4	53.6	45.3	55.8	69.2	88.1	94.8
Jan. 14	91.9	74.4	106.7	89.3	73.8	58.1	48.6	56.2	72.1	91.8	104.2
Jan. 21	93.0	74.7	104.0	86.0	78.1	60.9	49.8	55.8	72.9	96.3	107.5
Jan. 28	92 9	73.8	99.6	86.5	79.5	62.3	50.8	56.2	72.9	97.4	109.8
Feb. 4	90.7	70.9	100.8	83.8	81.8	66.9	49.9	56.0	74.9	100.8	113.3

4. However, output in that week remained 55.3 per cent above the 51,443 units assembled in the comparable week last year. The estimated total production during January of approximately 368,000 units is substantially higher than earlier predictions. Outlook for February is that automobile production will be slightly lower, but this trend might well be reversed if fears of possible labor disturbances this spring become acute.

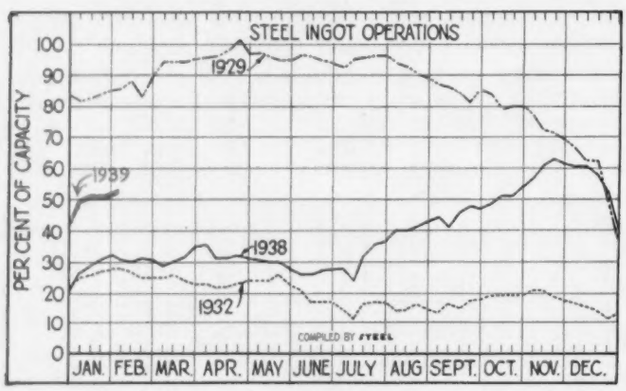
Revenue freight traffic declined contra-seasonally to 576,790 cars in the week ended Feb. 4, but remained above the 564,740 cars loaded in the same week last year. Power output in the week ended Feb. 4 eased seasonally to 2,287,248,000 kilowatt-hours, against 2,292,594,000 kilowatt-hours in the previous week.

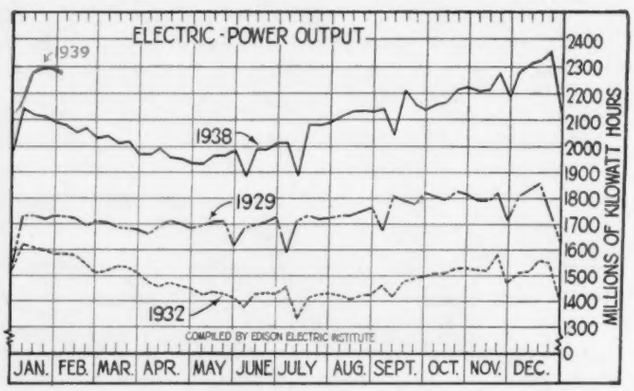
JANUARY IRON OUTPUT OFF 1.3 PER CENT

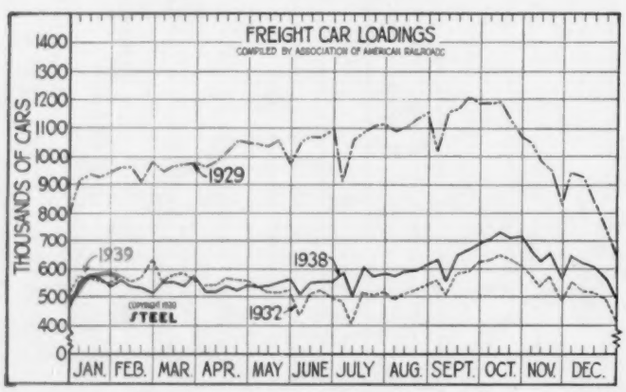
Average daily coke pig iron production in the United States in January amounted to 70,448 gross tons, a slight decline of 930 tons from the December rate of 71,378 tons. This was the lowest daily output since October, 1938, with 66,694 tons. Production for January a year ago averaged 46,608 tons. Active stacks on Jan. 31 numbered 118 compared with 115 on Dec. 31. Although the blast furnace operations improved in January, the gain was not sufficient to push production of coke pig iron above the December output. Relating production to capacity operations in January averaged 50.8 per cent, against 51.4 per cent in December and 33.6 per cent in January, 1938.

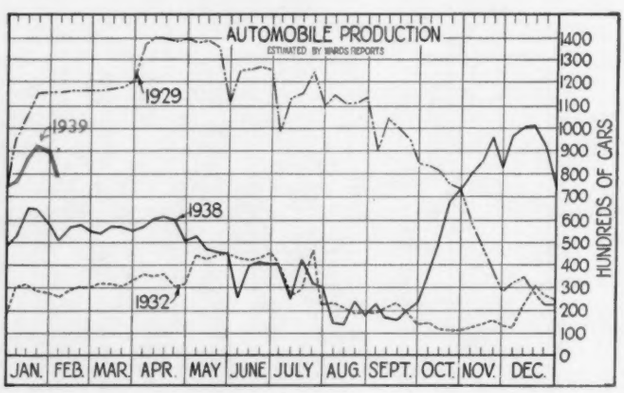
INGOT PRODUCTION UP SLIGHTLY

Steel ingot output during January totaled 3,186,834 gross tons, according to the American Iron and Steel institute. This compares with 3,143,169 tons in December. The indicated average daily production during January was 122,571 tons, against 120,891 tons in December. Ingot production last month averaged 52.69 per cent, compared with 53 per cent during December and 29.15 per cent in January, 1938. The cause of the slight decline in the operating rate during January, was attributed to the increased capacity figure for the industry, used by the institute in its tabulations. The new capacity for the steel industry for producing steel ingots and steel castings was placed at 73,061,569 gross tons per year as of Dec. 31, 1938. This represents a substantial increase over the capacity figure of 71,594,320 gross tons reported on Dec. 31, 1937, and is also the highest annual capacity total in the history of the steel industry.



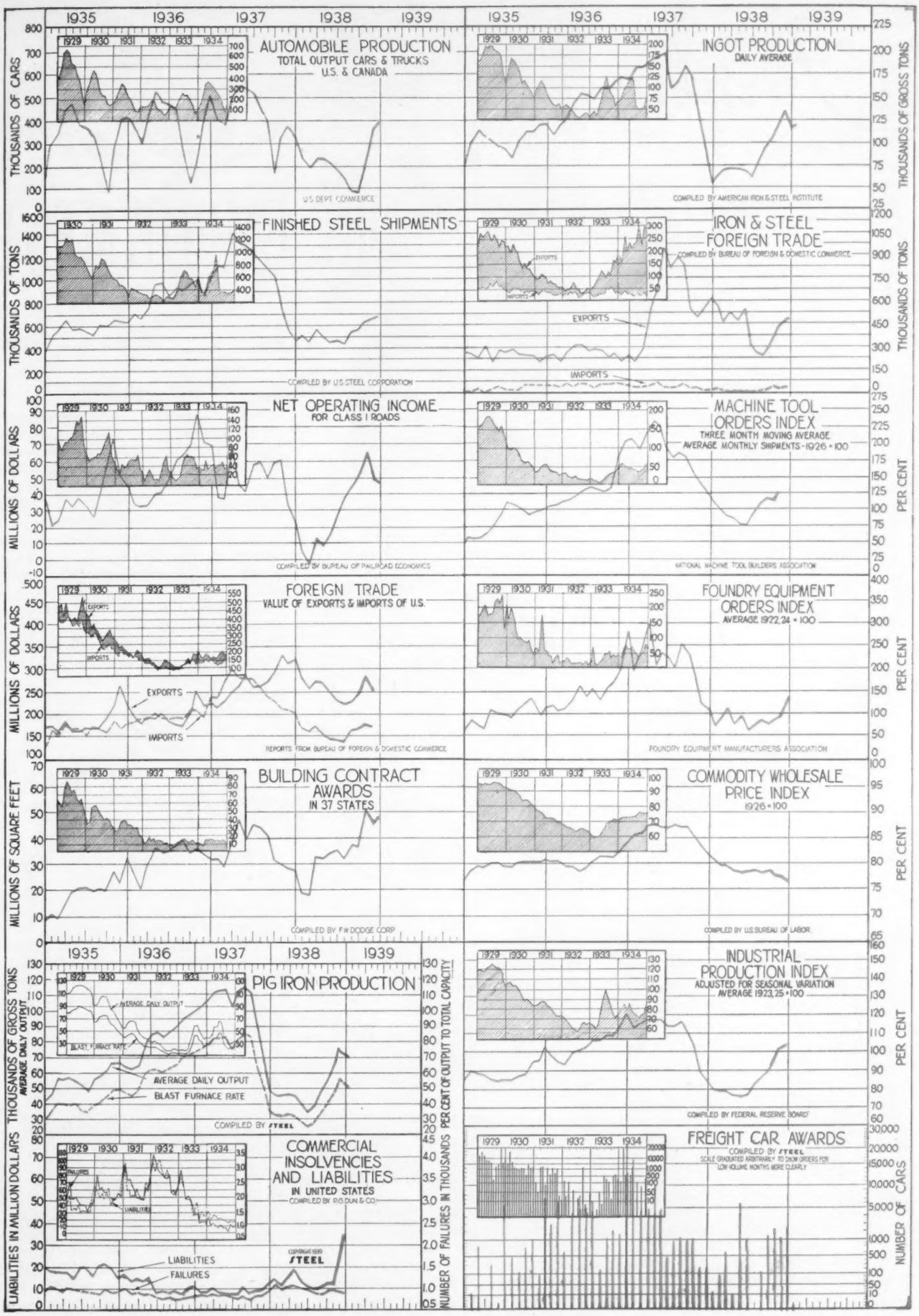






Week ending	Steelworks Operating Rate Per Cent 1938	1932	1929	Electric Power Output Million KWH 1938	1932	1929	Freight Car Loadings Thousands of Cars 1938	1932	1929	Weekly Auto Output 1938	1932	1929
Oct. 29	54.5	19.5	80.0	2,226	1,533	1,824	709	617	1,134	73,335	11,117	76,870
Nov. 5	57.5	21.0	80.0	2,207	1,525	1,816	673	587	1,072	80,030	12,247	73,048
Nov. 12	61.5	21.0	77.5	2,209	1,521	1,798	637	537	1,050	86,300	13,685	61,824
Nov. 19	63.0	19.0	73.0	2,270	1,582	1,794	657	576	983	96,735	16,497	49,160
Nov. 26	62.0	17.5	71.0	2,183	1,475	1,818	562	494	950	84,930	13,389	38,219
Dec. 3	61.0	16.0	69.5	2,285	1,510	1,718	649	547	837	97,795	12,398	28,079
Dec. 10	61.0	15.0	67.0	2,318	1,519	1,806	619	521	937	100,705	21,695	31,255
Dec. 17	58.0	14.0	63.5	2,332	1,563	1,841	606	517	923	102,902	30,589	33,293
Dec. 24	52.0	12.0	63.5	2,362	1,554	1,860	574	495	843	92,890	27,396	23,216
Dec. 31	40.0	13.0	38.5	2,120	1,415	1,638	500	407	638	75,215	25,598	23,967

	1939	1938	1932	1929	1939	1938	1932	1929	1939	1938	1932	1929	1939	1938	1932	1929
Jan. 7	51.5	26.0	25.0	84.0	2,169	2,139	1,619	1,542	531	552	573	799	76,685	54,084	30,755	75,000
Jan. 14	52.0	29.0	26.0	82.0	2,269	2,115	1,602	1,734	587	580	572	914	86,925	65,735	31,416	95,000
Jan. 21	51.5	30.5	27.0	83.0	2,289	2,108	1,598	1,737	590	570	562	932	90,205	65,418	29,365	105,000
Jan. 28	51.5	33.0	28.5	84.0	2,292	2,098	1,588	1,717	594	553	560	926	89,200	59,365	28,950	115,000
Feb. 4	53.0	31.0	28.5	85.0	2,287	2,082	1,588	1,728	575	564	575	947	79,410	51,443	27,110	116,000


1935 1936 1937 1938 1939
AUTOMOBILE PRODUCTION
TOTAL OUTPUT CARS & TRUCKS U.S. & CANADA
THOUSANDS OF CARS
U.S. DEPT. COMMERCE
INGOT PRODUCTION
DAILY AVERAGE
THOUSANDS OF GROSS TONS
COMPILED BY AMERICAN IRON & STEEL INSTITUTE
FINISHED STEEL SHIPMENTS
THOUSANDS OF TONS
COMPILED BY U.S. STEEL CORPORATION
IRON & STEEL FOREIGN TRADE
COMPILED BY BUREAU OF FOREIGN & DOMESTIC COMMERCE
EXPORTS
IMPORTS
NET OPERATING INCOME
FOR CLASS I ROADS
MILLIONS OF DOLLARS
COMPILED BY BUREAU OF RAILROAD ECONOMICS
MACHINE TOOL ORDERS INDEX
THREE MONTH MOVING AVERAGE
AVERAGE MONTHLY SHIPMENTS - 1926 = 100
PER CENT
NATIONAL MACHINE TOOL BUILDERS ASSOCIATION
FOREIGN TRADE
VALUE OF EXPORTS & IMPORTS OF U.S.
REPORTS FROM BUREAU OF FOREIGN & DOMESTIC COMMERCE
FOUNDRY EQUIPMENT ORDERS INDEX
AVERAGE 1922,24 = 100
FOUNDRY EQUIPMENT MANUFACTURERS ASSOCIATION
BUILDING CONTRACT AWARDS IN 37 STATES
MILLIONS OF SQUARE FEET
COMPILED BY F.W. DODGE CORP.
COMMODITY WHOLESALE PRICE INDEX
1926 = 100
COMPILED BY U.S. BUREAU OF LABOR
PIG IRON PRODUCTION
THOUSANDS OF GROSS TONS AVERAGE DAILY OUTPUT
AVERAGE DAILY OUTPUT
BLAST FURNACE RATE
PER CENT OF OUTPUT TO TOTAL CAPACITY
COMPILED BY STEEL
INDUSTRIAL PRODUCTION INDEX
ADJUSTED FOR SEASONAL VARIATION
AVERAGE 1923,25 = 100
COMPILED BY FEDERAL RESERVE BOARD
COMMERCIAL INSOLVENCIES AND LIABILITIES IN UNITED STATES
COMPILED BY R.G. DUN & CO.
LIABILITIES IN MILLION DOLLARS
NUMBER OF FAILURES IN THOUSANDS
LIABILITIES
FAILURES
COPYRIGHT 1939 STEEL
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW VOLUME MONTHS MORE CLEARLY
NUMBER OF CARS

Forum on RE-EMPLOYMENT

■ FORTHRIGHT statements of certain conditions involved in our unemployment situation, and definite and almost startling suggestions for effecting quick, sweeping industrial recovery of this nation are set forth in this week's Forum.

This article is by Robert A. Weaver, president of the Ferro Enamel Corp., Cleveland. It was prepared on the verge of his departure on an extended trip overseas, during which he will visit subsidiaries and representatives of Ferro Enamel, located in several foreign countries. It represents the views of a man who for nearly 25 years has been one of the recognized leaders in the industrial promotion of porcelain enameling and in the manufacture and sale of enameling equipment and materials; who is a director of one of the best known banks in the middlewest; and who is active in civic affairs.

Following graduation from Kenyon college in 1912, Mr. Weaver spent five years in the sales department of a stove manufacturing company. It was during that time that his interest was awakened in the then unrecognized possibilities of porcelain enamel finish for industrial products. Because of his noteworthy suggestions along this line he was made sales manager of an enameling concern in Baltimore; then in 1919 he organized one of the two forerunners of what is now the Ferro Enamel Corp. in Cleveland.

Mr. Weaver believes that world-wide economic and political disturbances warrant establishment of a coalition government in this country, all politics to be eliminated from the national administration for five or ten years. He believes that non-partisan commissions of experts should be set up to submit to Congress plans for solution of our major problems —this along the line of the Royal commissions which have functioned successfully in Great Britain.

—The Editors

■ THE FIRST STEP toward solution of any problem is to define the problem itself. With this in mind it becomes obvious that one of the worst indictments against our present national administration is the fact that even after seven long, hard years, our "number-one problem"—which is unemployment—has not yet properly been defined. No intelligent effort has yet been made, for instance, to find out definitely just how many people really are unemployed. We do not know how many of the so-called unemployed are of the same type as those who in other decades never did work regularly. We do not know how many actually are employable. In fact we do not have definite information on several of the vital details of this great problem.

Thirty years ago there were in all small villages and towns, and even in the larger cities as well, a great many people who had no regular work. These people did odd jobs. When such jobs were not available in town many of them went out into the country where they lived on farms and did odd jobs on the farms. Somehow, someway, they did manage to keep themselves alive. That group today undoubtedly is either on relief or on WPA, and the individual members of it undoubtedly are living better and much more comfortably than did their fathers and grandfathers before them.

Of late years there have been many women in industry. These same women — had they lived in previous decades—would have stayed at home. They would have had no thought of entering the fields of industry or business. One can think of many other types of people who similarly have become classified as unemployed, who in reality should not be considered as a part of this problem group.

Unemployment Not Permanent

We are being told that in this country we are from now on always going to be faced with a big unemployment problem. Personally I do not think that any such statement is justified. Consider the present condition of untold thousands of buildings and homes. Look at the physical condition of the railroads. Think of the thousands of miles of worn out, unsafe and unimproved highways, and of the vast number of grade crossings

which should be eliminated. If along with all the public and semi-public requirements, you consider the growing desire on the part of millions of our people for better automobiles and better clothing—as well as better homes—it becomes apparent that there is in this country almost limitless work to be done. The fulfillment of the desires of our people is limited only by their ability to pay for things. If they have jobs they will buy and they will pay. The cycle must be built up whereby some of these great needs of the country are translated into jobs, which in turn will stimulate the buying and paying phases, and that in turn will very quickly generate jobs for many thousands more people.

Politics Retard Progress

An immediate solution to the problem would be effected if there were acknowledgment on the part of the political and business leaders of this country that there is a world-wide economic and political crisis and that strenuous measures must be adopted in order to protect our country. The first step necessary would be the elimination of all politics from the national administration for a period of at least five and possibly for ten years.

If President Roosevelt would announce tomorrow the establishment of a national cabinet and coalition government embodying the patriotism and best brains of both our great political parties, the stimulus to American business and to our markets would be unprecedented in all our history. If this national government would then quickly decide on the five or ten really major problems facing our country, and then put these problems into the hands of the best informed experts—with orders to submit solutions to Congress at the earliest possible moment—we could have real hopes for the prompt solution of these problems.

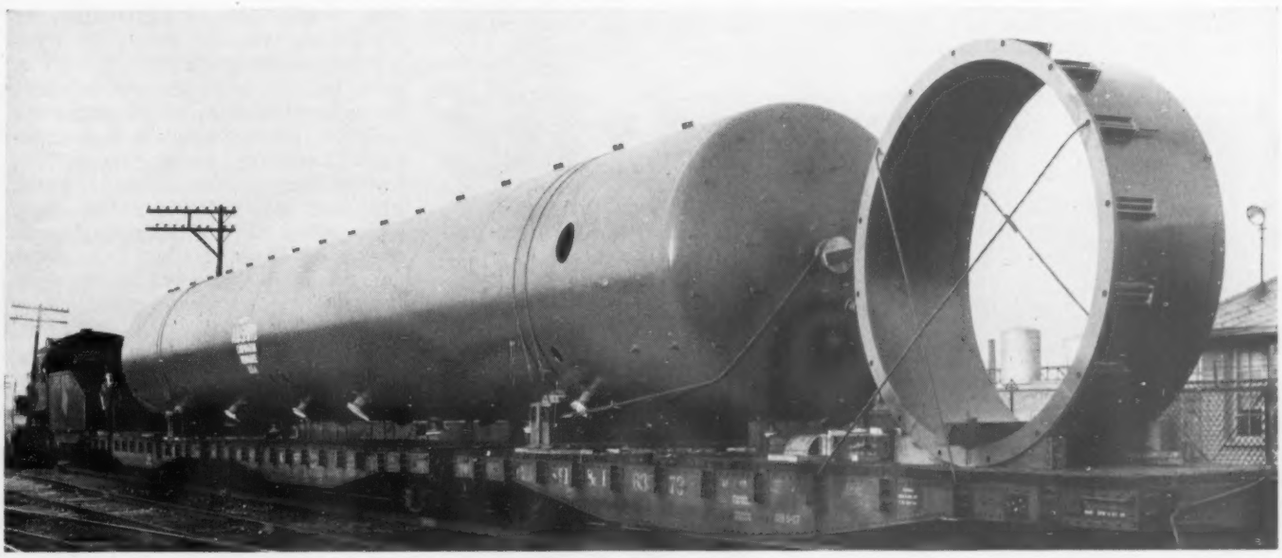
Robert A. Weaver
President, Ferro Enamel Corp.
Cleveland

I would like to point out that over a long period of years England has had many experiences with Royal commissions. These Royal commissions, which report back to the government with plans which are non-partisan and which are expertly worked out, have functioned successfully in connection with many truly tremendous projects. As things are with us under the present set-up, any really constructive moves suggested by Republicans would be opposed by Democrats, and vice versa. President Hoover actually did have this idea of appointing expert commissions, but he failed to follow through with proper support of their findings. Remember, for instance, the Wickersham commission and its report.

Strenuous Measures Needed

If democracies are to continue they must keep on producing goods and they must keep their people happily employed. They cannot do these things if they keep on playing politics. To my way of thinking, Nero's fiddling while Rome burned, had nothing on the existing situation in Washington. On the other hand, I am convinced that if Mr. Roosevelt should see fit to follow some such course as has just been outlined it would immediately cause him to be ranked among the most outstanding of our presidents and it would assure him of a place in history which he certainly never will achieve if his present methods are continued.

Three Cars Required to Carry Refining Tower



■ **Snaking this 110-foot oil refining tower around curves and over bridges created quite a problem for the railroads. Three special cars were used. This exceptionally large pressure vessel was electrically welded by A. O. Smith Corp., Milwaukee, and was lined throughout with chromium alloy steel as a protection against corrosion. The supporting skirt in the foreground will be bolted to the vessel in service. This tower was fabricated for a Pennsylvania refinery**

Conditioning Mill Rolls

Production of proper roll surface depends upon giving careful attention to every factor involved. How speed, feed, type of wheel and methods used influence results obtained is explained here in detail with typical examples

By H. J. WILLS
The Carborundum Co.
Niagara Falls, N. Y.

■ THE SURFACE of a rolled steel product can be no better than the surfaces of the rolls through which it passed. Rolls out-of-round, or not straight, will produce sheets or strips uneven as to gage; patterns on the rolls will be reproduced on the product.

Mill men are sometimes puzzled to find patterns on sheets or strips that were produced by rolls whose surfaces had a high, mirror-like luster. Luster may be a reflection of light from narrow but deep grit marks which of course are transferred to the product. Also, final polishing or burnishing with a non-cutting wheel, although giving luster to the roll, may cove over serious faults in the surface by folding down grinding-wheel ridges. While such a roll looks perfect, the bent-down ridges will flake off quickly, leaving the under surface exposed and fre to reproduce itself on the product.

"Surface" and "finish" are not the same. A high luster, as just explained, may disguise a poor surface. On the other hand a dull, matte or velvet finish may prejudice the uninformed observer against a roll which actually has a surface as nearly perfect as can be achieved. However, a fine finish can also be applied to an excellent surface. The point is that the *quality of the surface* is the most important factor. Almost any desired finish can be applied to a good surface.

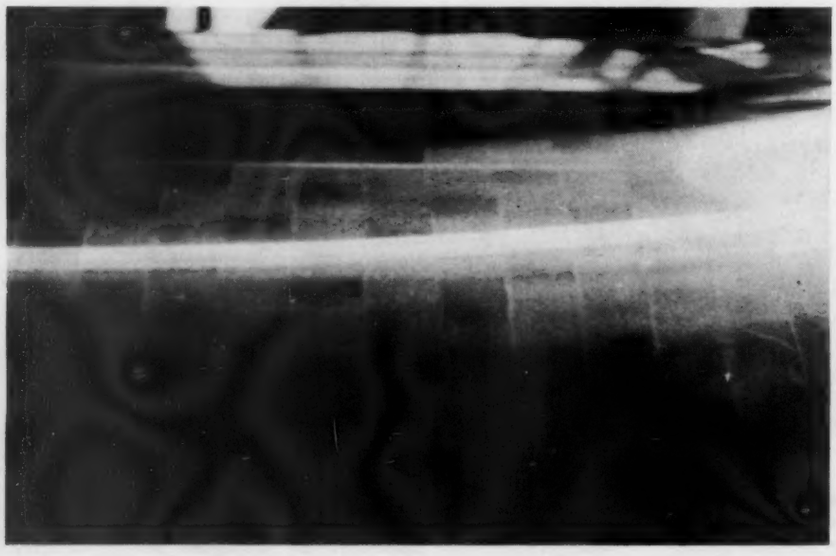
The only satisfactory way to select the best wheel for any roll-grinding job is by test. Once a satisfactory wheel is selected, keep a complete record of the job, the machine used, the wheel and the procedure.

The higher the ratio between wheel speed and work speed the less the stress on the wheel face and the harder the wheel acts—and vice versa.

Multiple Wheels Advantageous

To secure proper penetration of the grains into the work when using a coarse grain wheel with a wide face, it is necessary to exert excessive pressures which cause the wheel to glaze quickly and to chatter. Therefore, when it is desired to get the benefit of wide faces, it is best to substitute for a single wide wheel several narrower ones separated about 1/16-inch by spacers. This has several advantages. It reduces the power consumption considerably and gives additional cutting edges because the advancing edge of a wheel does most of the work.

In general, silicon carbide wheels are used to produce high luster, and aluminum oxide wheels for satin finishes. This is especially true for chilled iron rolls. Hardened steel



Effect of out-of-round and out-of-balance in the grinding wheel, producing a checker-board appearance

This shows "chatter" marks resulting from using a glazed or loaded grinding wheel

rolls should be ground with aluminum oxide for both the roughing and finishing operations, although silicon carbide wheels or special aluminum oxide wheels may be used to produce a luster. Recent developments have made it possible to grind hardened steel rolls with silicon carbide wheels without leaving characteristic scratches, and producing clear black finishes.

Because of the difference in the characteristics of roll-grinding machines, a wheel which will do a satisfactory job on one machine may not be at all suitable for grinding an identical roll on another. On the type and quality of the wheel spindle and bearing depends to a great extent the selection of wheel grit, grade and bond in order to prevent chattering, burning and scoring.

Spindle Is Determining Factor

A high quality spindle running in a properly lapped cap or sleeve bearing of bronze or babbitt will permit soft wheels to be used, while spindles which vibrate or wabble necessitate a harder wheel and usually an organic bond. Integrally mounted spindles and motors often result in hammering caused by vibration unless they are carefully balanced as a unit.

Vibration may also be caused by whipping drive belts or chains, poor belt splicing, uneven belts, faulty work-head thrust bearings, faulty work-drive or proximity of other equipment.

Even a machine which is amply powered may suffer from variations in speed, which always result in wheel loading, discoloration of the work, or uneven grinding. The trouble may be found in excessive friction, low power line voltage, belt or wheel slippage and similar maladjustments.

The machine should be located in a spot where the temperature is reasonably constant and where there are no drafts or direct sunrays; otherwise accuracy of work may be affected through distortion caused by heat acting on either the machine or the work.

Whatever coolant is used should be soft and clean. Hard water used with soluble oils will form an insoluble soap which is apt to retard the cutting action. Hard water may be softened by adding sal soda or soda ash. Soda prevents the rusting which may occur with plain water. Too much soda will keep the wheel face from glazing, which is desirable during the cutting but undesirable when the same wheel is used for putting on the final polish. If the wheel face will not glaze when used with a mild soda solution, addition of a little soluble oil is usually helpful.

Many a fine finish has been ruined by impurities in the coolant. It is possible to strain out some of them by tying several thicknesses of cambric over the coolant discharge nozzle, but it is best to circulate the coolant constantly through a good filter. To prevent the introduction of grit, it is advisable to wash the wheel guards thoroughly when changing grinding wheels.

Resinoid and shellac bond wheels may be seriously damaged if used with strong soda solutions. They should be washed when removed from the machine for storing.

An improperly balanced wheel will mark a roll with broad, heavy, "checker-board" marks similar to those caused by an out-of-round wheel. When using ultra-finish wheels it may be necessary to balance a wheel both before and after truing. This is because the wheel may require truing to correct an out-of-round condition. After truing it will, of course, be out of balance. After truing a wheel with coolant running on it, spin the wheel to remove moisture before balancing.

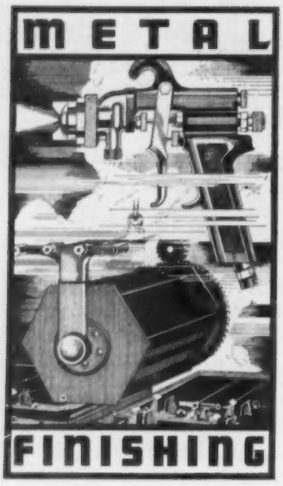
Self-Sharpening Desirable

Varied opinions are held as to the necessity for dressing or sharpening a wheel, especially in the course grit range for hot mill rolls. A grinding wheel to be efficient must be partially self-sharpening through the breaking away of the abrasive crystals when their tips become dull or coated with metal, or the breaking away of their material or bond. If the abrasive and bond are of a sort that permits rapid breakdown, and so require no dressing, the wheels necessarily wear rapidly. If, on the other hand, they do not break down, excessive dressing is required which causes a serious loss of useful abrasive.

Much careful observation of wheel costs leads to the belief that the best practice is: For hot mill rolls, wheels 20 to 36 grit, one diamond dressing per roll; for cold mill rolls,

(*Please turn ao Page* 74)

These are traverse lines caused by a grinding wheel which was dressed on a taper



Continuous Ternes

A combination of modern cold rolling, electro-cleaning and processing method produces terne plate in continuous lengths and so eliminates former difficulties caused by seams

By C. H. MANION
Chief Engineer
Follansbee Bros. Co.
Follansbee, W. Va.

■ CONSISTING of steel sheets about 0.01-inch thick, terne roofing plate features as a coating a mixture of about one-fourth tin and three-fourths lead and so combines the strength of steel with the weather-resisting and protective properties of the terne mixture. Easiest way to apply terne roofing was found to be in the form of factory-made rolls produced by lock seaming 7 x 10, 14 x 20, or 20 x 28-inch sheets together into rolls of 50 feet or longer. The seams were generally, but not always, soldered.

After the introduction of the long terne sheet, Follansbee Bros. Co., Follansbee, W. Va., pioneered in the manufacture of roll terne roofing from sheets 96 inches long, materially reducing the number of cross seams. Thus, the trend has been toward elimination of cross seams by utilizing the longest sheet it was practical to coat uniformly and dependably.

Now, after much experimental work in the continuous coating of terne metal on long steel strips, the Follansbee company has succeeded in combining terne-coating experience with modern cold-strip-rolling and electro-cleaning facilities. With improved, patented methods of pickling and processing, the result is terne roofing in rolls without seams.

Such material is produced by cold reducing hot rolled, copper bearing, strip steel to the required thickness, making a one-piece coil of copper-bearing steel of the required gage and with a grain structure and physical makeup that give maximum ductility after annealing. The coils are annealed dead-soft, cooled and then temper rolled to the exact stiffness required.

The annealed strip is passed, first, through a high-powered water spray scrubber and thence through a long electrolytic cleaning tank. After this a high-speed water-and-brush scrubber removes what little saponified film remains. Strip then passes through a rotary slitting shear that trims the edges square and true, making impossible the camber often found in seamed-and-soldered rolls. Next a roller leveler removes all coil set, buckles and waves. A measuring device and cut-off shear cuts the strip to the required length (50 or 100 feet) following which it is further prepared for pickling.

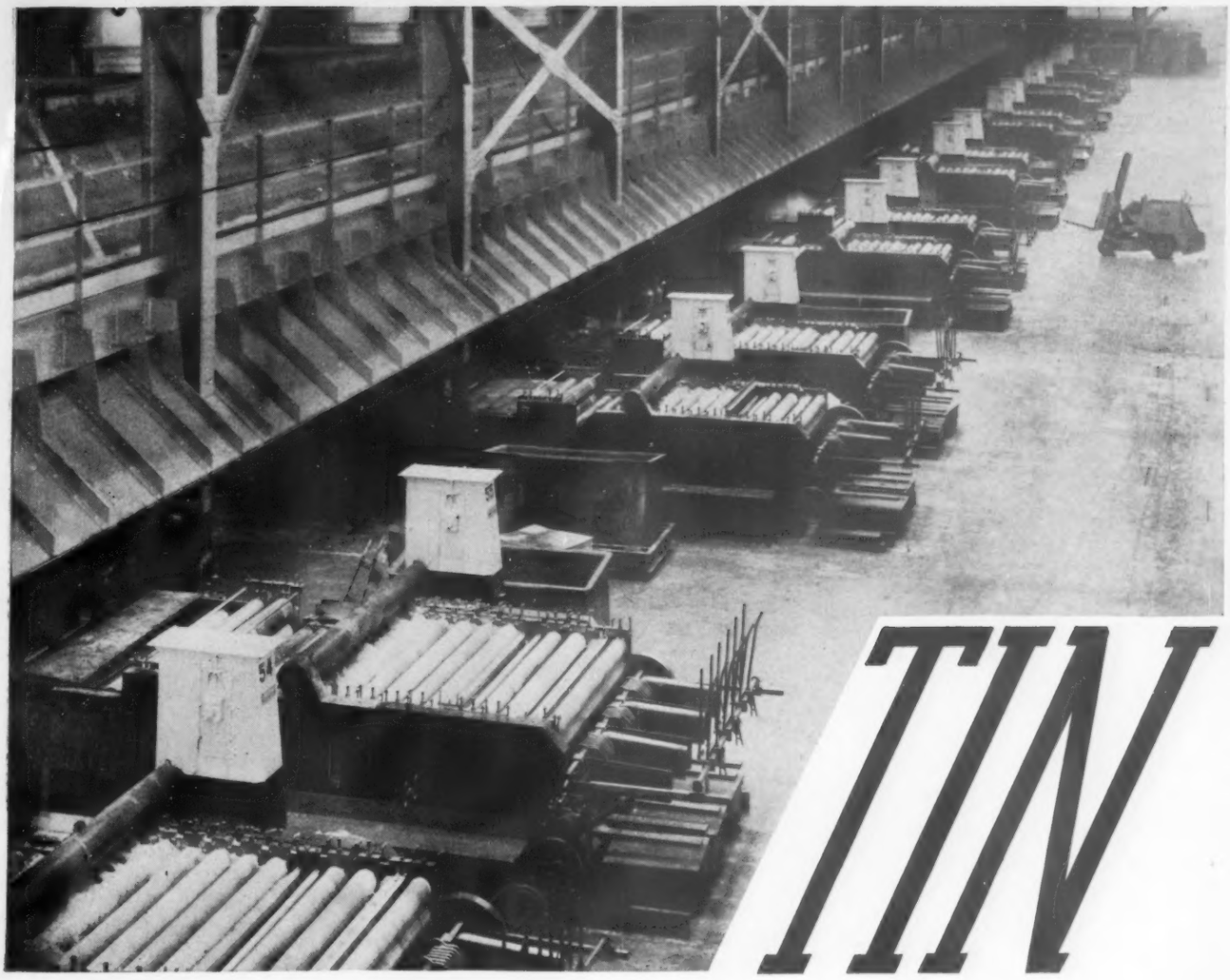
The Follansbee organization found that pickling continuous cold-rolled light gage coils for terne coating required the design, development and construction of entirely new methods and equipment. Such methods and equipment are now patented and in operation.

Leaving the pickler, the coils pass through a flushing, washing and soaking process to remove the acid from the surface and pores of the steel. Next coils go through a flux bath into the pure hot terne metal, through the special coating machine and oil bath, over cooling conveyors, processing and cleaning machines, inspection tables, further roller leveling, and finally into the coiler. The

(*Please turn to Page* 80)

Welded "Sno-Motor" Hauls Heavy Loads in Deep Snow

■ **James Frankland and R. F. Grefe, United States Forest Service, Division of Engineering, Portland, Ore., developed new machine pictured here. It is all-welded steel construction, is powered by an 85-horsepower gasoline engine, hauls 24 people or 3000-pound payloads, travels 12 miles per hour. Snow 15 feet deep and grades of 35 per cent offer no difficulties. Unit is a single-track tractor with a combination of weight and track area giving low track pressure for operation in soft snow. Length of motor and sled is 34 feet; sled is 4 feet wide, tractor cleats 4½ feet wide. Machine offers great possibilities in reaching areas formerly closed in winter**



TIN

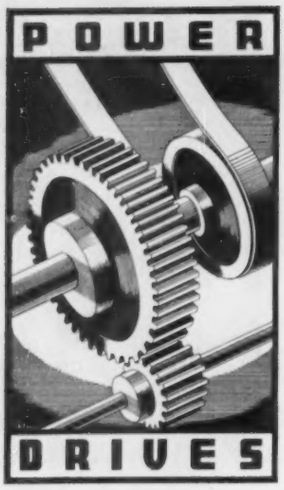
MAXIMUM PRODUCTION at MINIMUM COST

That's what Kemp Immersion Melting (with gas) is giving in *modern* tin stacks the world over. When tin pots are equipped for this better, faster, cheaper way of melting, no crew and no machine can out-step hot metal.

That's why the installation shown above was designed and built for Kemp Immersion Melting . . . making this an important part of one of the world's largest and most efficient tin-plate mills.

Remember, *speed* is only part of the Kemp story. Kemp also gives you more accurate, fully automatic temperature control, less dross and material savings in fuel. For details address **The C. M. Kemp Mfg. Co., 405 E. Oliver St., Baltimore, Md., or Oliver Building, Pittsburgh, Pa.**

KEMP of BALTIMORE



Friction Loads

Proportion of friction load to total load is a most vital factor on many drives. How to determine importance and extent of the frictional load is detailed here

By R. F. EMERSON
Industrial Dept.
General Electric Co.
Schenectady, N. Y.

■ OVERCOMING friction is a large portion of the work given every motor. In materials handling, the total load may also include overcoming inertia and gravity. These loads, however, can be calculated easily and accurately.

Friction loads, on the other hand, are difficult to evaluate because of many variables such as lubrication, pressure, velocity and temperature. Selecting a motor size thus becomes increasingly difficult as the proportion of friction load becomes greater.

For instance, a simple hoist with cable going directly from hook to drum involves little friction, that of two well lubricated bearings not subject to much variation. Motor size calculations here would be limited to inertia and gravity considerations.

Now, consider a horizontal conveyor consisting of a trough in which objects are hauled at constant speed by a chain with spurs or by a cable with buttons. Here neither gravity nor inertia is of importance as the load is practically all friction. Also, it may be subject to great fluctuations caused by varying conditions, such as dry material in a dry trough, wet material on a wet trough, ice or oil covered material on an ice or oil covered trough, etc.

Motor Selection Based on Tests

Motor selections for such drives are largely based on tests and experience, fortified by a shear pin or "iron fuse" for with conveyors extending over a considerable distance, the loss at each rubbing point may not be great but the large number of such points makes the total friction loss the main part of the motor load.

When calculating friction losses, nature of surfaces involved must be considered. Two unlubricated surfaces produce much more loss than if lubricated. This loss may vary greatly with changes in pressure between the surfaces and their degree of smoothness. While velocity is not usually an important consideration with dry surfaces, friction does increase considerably when the speed is reduced to near the stopping point.

This type of load demands careful thought as to relative values of gravity, inertia and friction loads. Over-motoring to make sure the machine will operate under all possible conditions results in: Low power factor, if induction motors are used; higher first cost of motor and control; higher demand rate; and in some cases larger supply cables.

To illustrate these points and to visualize friction effects, a machine involving little friction and another where friction forms the larger portion of the load will be calculated. A hoist where the motor is connected to a hoisting drum through gears and where the hoisting rope is carried from the hoisting drum through four sheaves will be considered as an example of the first case.

Load Raised at Constant Speed

Here the load is usually raised at a constant speed. Total load on the motor is the result of overcoming gravity and friction. Calculation of the gravity load is quite simple and is done in the usual manner. Friction losses are divided between gear loss and loss in rope sheaves. In Fig. 1, the 10,000 pound load is hoisted at 210 feet per minute. As rope winds on drum, it must exert sufficient pull to overcome gravity as well as friction in

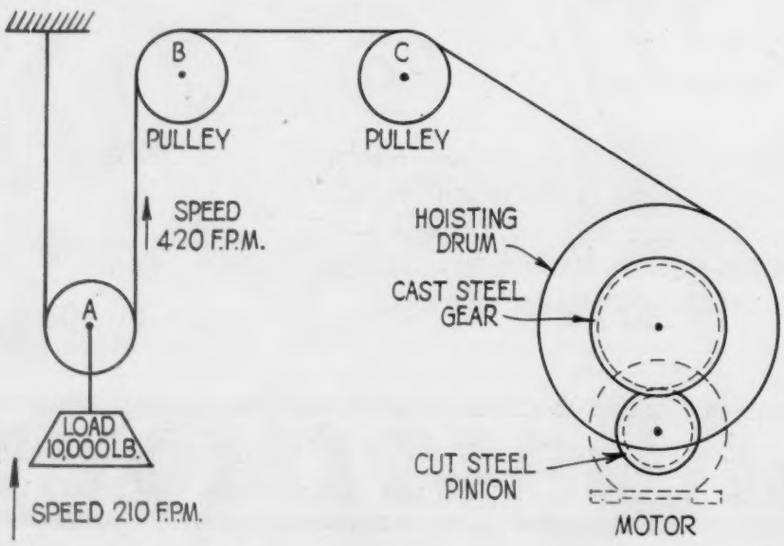


Fig. 1—Type of load where friction is small and varies little. All hoists are primarily of this class

YOUNGSTOWN Rectangular Pipe Freezes

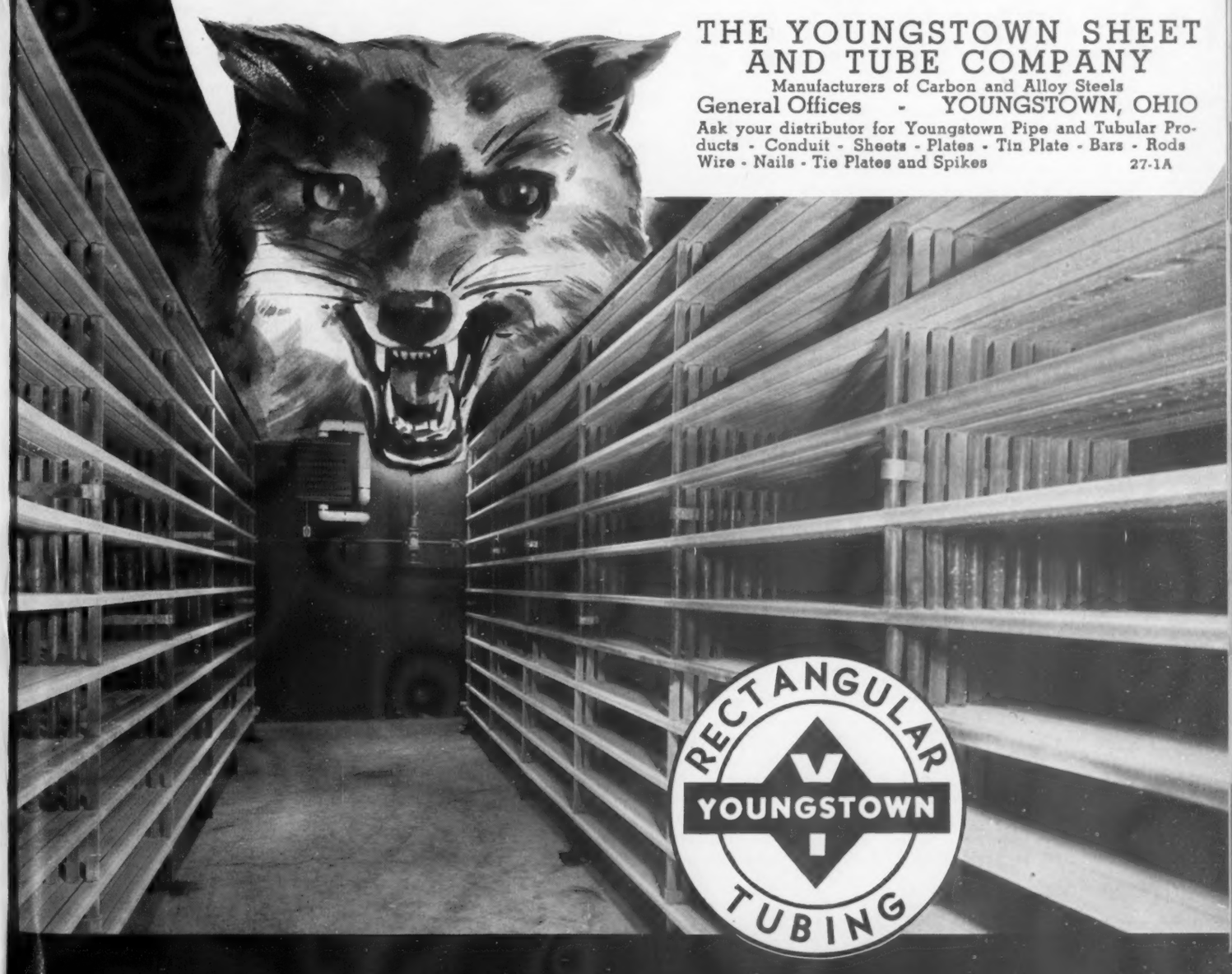
300,000 Pounds of Horse Meat for Fox Farms

Faced with the job of designing equipment to freeze and store 300,000 pounds of horse meat for the fox farm of Herbert A. Neiman & Co., the Vilter Mfg. Co. of Milwaukee decided on Youngstown rectangular pipe made up in their patented high economy coils. Because of its flat shape, the pipe can be used as shelving which carries the refrigerant, and so freezes quicker and more efficiently.

The rectangular pipe used in fabricating this refrigerating system carries ammonia gas under pressures ranging from 150 pounds to 15 inches vacuum and temperature changes from 60° to 50° minus. Because of closely controlled manufacturing processes coupled with rigid inspection practices the Youngstown rectangular pip -- 56,160 feet of it -- used in this unusual insta lation was found admirably suited for the servic for which it is being used.

The pipe was welded into 40' lengths and place side by side to make shelves. In the top sid at each end a 1¼" X.H. Nipple is welded fro one pipe to the length above it. This fox far uses 25,000 pounds of horse meat a day, an because of the dependability of Youngstow pipe, the foxes have never missed a meal.

There are many ways you can use Youngstow Rectangular and Square Pipe to save money an time, help you make a better job. Write fo complete data.



THE YOUNGSTOWN SHEET AND TUBE COMPANY

Manufacturers of Carbon and Alloy Steels

General Offices - YOUNGSTOWN, OHIO

Ask your distributor for Youngstown Pipe and Tubular Products - Conduit - Sheets - Plates - Tin Plate - Bars - Rods Wire - Nails - Tie Plates and Spikes 27-1A

pulleys A, B and C and friction of cable winding on drum.

Friction at A is equal to bearing coefficient of friction multiplied by total weight in pounds and divided by pulley radius in feet. As indicated previously, the coefficient of friction may change considerably under various conditions of operation but a value of 1.5 per cent can be assumed. Allow 3 per cent loss due to friction of rope on the winding drum. Rope pull then becomes 5000 over (0.97 times 0.985-to-the-third-power), or 5419 pounds at drum diameter.

Determining Horsepower Required

Allow 94 per cent as efficiency of cast gear reduction and 96 per cent for the cut steel gear (gears to hoisting drum), which then gives horsepower required to drive the hoist as (5419 x 420) over (33000 x 0.96 x 0.94), or 76.4 horsepower. Undoubtedly a 75-horsepower motor would have sufficient torque to operate this hoist and the heating of the motor would be well below normal unless the number of accelerations were unusually high.

Now assuming no friction in pulleys, drum and gearing, the horsepower required would be (5000 x 420) over (33000), or 63.6 horsepower. This shows that 12.8 horsepower is consumed by friction losses, or 16.6 per cent of the total load. If an error of say 20 per cent entered into calculating the friction load so figure was 15.2 instead of 12.8, motor load would be 63.6 plus 15.2 or 78.8 horsepower. Without doubt this would still be within the capacity of a 75-horsepower motor, particularly if consideration is given to rest periods and times when the hoist is operating on reduced loads.

Thus in an application where friction is a small portion of the total load, accuracy in determining the actual friction load is not usually of prime importance.

Next consider a machine having a large friction load such as a small conveyor used on an assembly line to carry small articles. It may consist of a belt which slides on a maple bench with return belt also supported. To calculate the horsepower, disconnect motor from machine and substitute a lever arm as shown in Fig. 2.

With a spring scale, determine pull required to move equipment. Doubtless the pull at start will be considerably more than the steady pull required to maintain motion. This is due to static friction. First trial may indicate more static friction than succeeding trials, as there is a metal to metal contact in the bearings on the first trial. Thereafter bearings begin to lubricate themselves.

This first large load at cold starting, particularly noticeable with plain bearings, represents the maximum load. Multiplying pounds pull by lever-arm length in feet gives the torque. Take the speed from

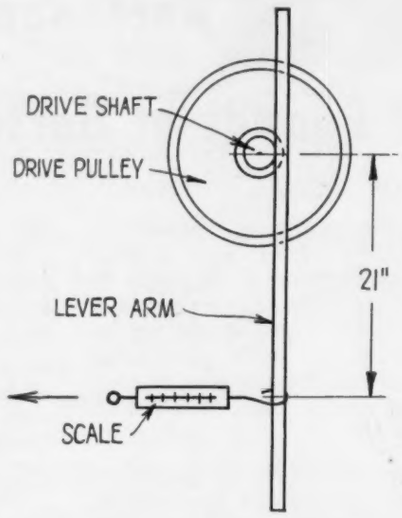


Fig. 2—Setup used in determining torque values where frictional loads are apt to be high and to vary widely as in conveyors, etc.

the motor nameplate and multiply this by the pounds pull, divided by 5250. Result is horsepower required to drive conveyor.

Assume a lever arm of 21 inches (1.75 feet) and a scale reading at 18 pounds at first trial after a prolonged period of idleness. Assume also that immediately after a period of running, the scale shows only 12 pounds. The 18-pound reading represents the starting torque and includes static friction. The 12-pound reading indicates running load conditions so motor horsepower is 12 x 1.75 x 1000/5250, or 4 horsepower.

Since lever arm used in place of motor operates through all gearing between motor and conveyor, the torque reading obtained includes all losses in gearing so nothing need be added for friction. While 4 horsepower is the actual running load, the next size larger standard motor, 5 horsepower, will be used. On this type of application with friction so important, it is necessary to find out actual friction values by some such scheme as described here.

On these applications, starting torque plays an important part and so also must be carefully determined. Since static friction load is 50 per cent greater than running friction load, the 5-horsepower motor must be able to exert a starting torque of 4 x 1.5, or 6 horsepower, which is 120 per cent of the 5-horsepower full load torque. Practically any standard, general purpose, 5-horsepower, squirrel cage, induction motor is capable of exerting more than 120 per cent starting torque at full voltage, except possibly the 60-cycle motors at ratings near 600 revolutions per minute. Starting torque rating of the motor should be determined if not known. If available starting torque is, say, 33 1/3 per cent greater than starting torque required under the worst known conditions, there would never be any difficulty from that particular source.

If located out-of-doors where cold weather would cause extremely stiff oil and grease, the difference between starting and running torque might be much greater. In fact, static friction might be so great that normal starting torque of a general purpose induction motor would not start the conveyor. For such an application, a motor with higher starting torques and low starting current should be considered rather than selecting the next size larger, general purpose, squirrel cage, induction motor.

Before the advent of the high torque, squirrel cage motor it was quite usual to find all the high-starting-torque drives in a plant powered by general purpose squirrel cage motors running at about half load with resulting low power factor in the plant. This is extremely poor practice as it penalizes the plant for bringing out all the disadvantages of low plant power factor, too well known to need describing here.

♦

Stress, Strain Formulas In Compact Volume

■ *Formulas for Stress and Strain*, by Raymond J. Roark; 326 pages, 6 x 9 inches; published by McGraw-Hill Book Co., New York; supplied by STEEL, Cleveland, for $3; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London, S.W. 1.

The author's purpose is to make available a compact, adequate summary of the formulas, facts and principles pertaining to the strength of materials. It is intended primarily as a reference book and represents an attempt to meet what is believed to be a present need for the designing engineer.

In Part I are defined all terms whose meaning might otherwise not be clear. In Part II certain useful general terms are stated; analytical and experimental methods of stress analysis are briefly described and information concerning the behavior of material under stress is given. Part III treats of the behavior of structural elements under various conditions of loading aand extensive tables of formulas for the calculation of stress, strain and strength are given.

PRAISE FROM A FURNACE BUILDER IS PRAISE INDEED

Read what one builder says about "Carbofrax"

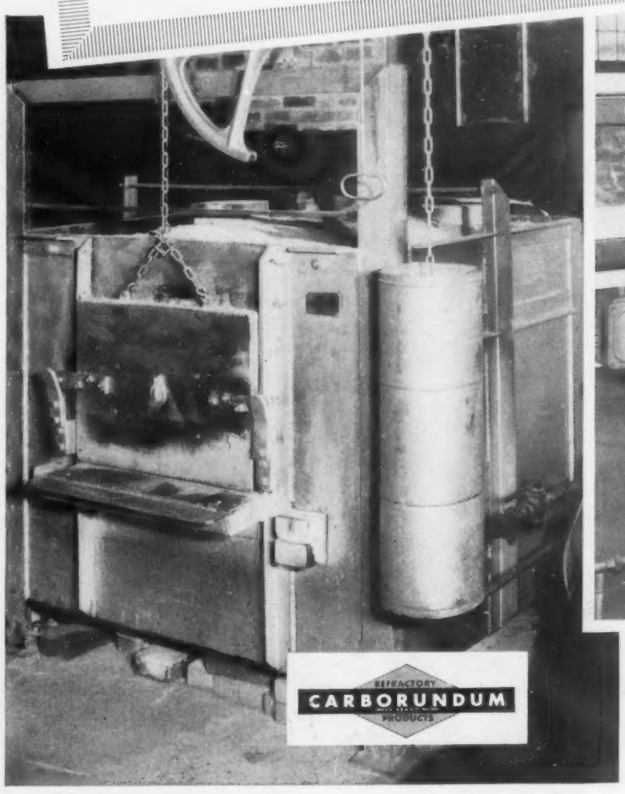
"We use 'Carbofrax' materials to obtain rapid heat transfer. We find it stands up in service--" says The M. K. Epstein Company, builders of Dempsey and Gilbert, and Barker Furnaces.

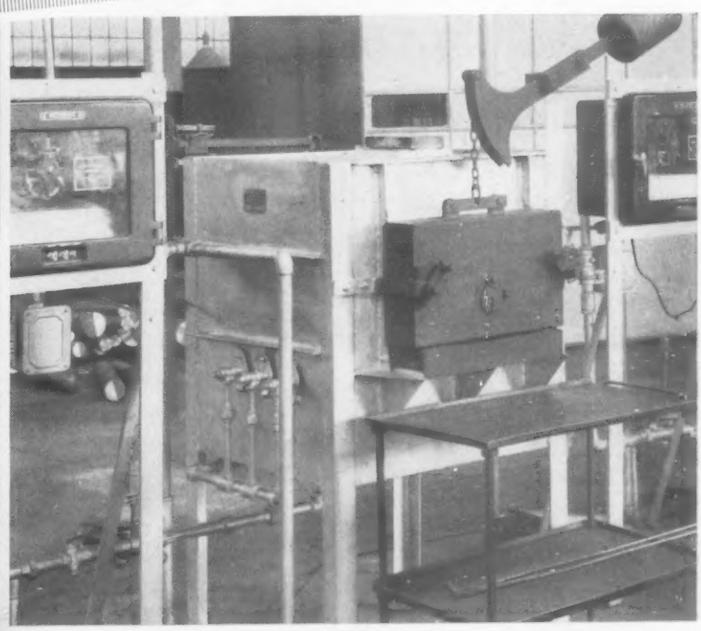
Illustrated are two of the many furnaces utilizing "Carbofrax", built by this well known, progressive firm of Springfield, Mass.

Its reputation for building high quality furnaces is well founded on progressive engineering and on the specification of the highest quality materials for furnace construction.

The M. K. Epstein Company has used "Carbofrax", the Carborundum Brand Super Refractory, for many years and regularly specifies it in furnaces where rapid heat transfer and resistance to high temperatures are required.

The acceptance of "Carbofrax" as a standard by such a leader in the furnace building industry is an indication that this super refractory can reduce costs and speed production in your heat treating shop.





THE CARBORUNDUM COMPANY

REG. U. S. PAT. OFF.

REFRACTORY DIVISION, PERTH AMBOY, N. J.

District Sales Branches: Boston, Chicago, Cleveland, Detroit, Philadelphia, Pittsburgh. Agents: McConnell Sales and Engineering Corp., Birmingham, Ala.; Christy Fire Brick Company, St. Louis; Harrison & Company, Salt Lake City, Utah; Pacific Abrasive Supply Co., Los Angeles, San Francisco, Seattle; Denver Fireclay Co., El Paso, Texas.

(Carborundum and Carbofrax are registered trade-marks of The Carborundum Company)

THE RIGHT OIL FILM IN TODAY

Worth $10,00

It takes a sturdy, stable oil film to protect a mill roll bearing from burning out ...causing a plant shut-down! Gargoyle D.T.E. Oils supply this film—plus a resistance to chemical change that results in oil economy. Proof of this is in the record of these oils. Let the Socony-Vacuum man give you all the facts.

WHAT THE Socony-Vacuum man wants to do is: *help increase your production profits!* Here are his exclusive tools: The finest lubricants made. 73 years' experience...and thousands of case histories —to guide him in the use of lubricants exactly right for your machines. Close cooperation with machinery builders...and world-famous research laboratories—to develop new lubricants ahead of new needs.

Furthermore, world-wide distribution and uniformity make Socony-Vacuum Industrial Lubricants of the same quality available everywhere.

Isn't that well worth talking over with the Socony-Vacuum man? We believe you'll find it time well spent.

DAY'S MILL ROLL BEARINGS IS ...00 An Hour

Another Tough Job for
OIL FILM

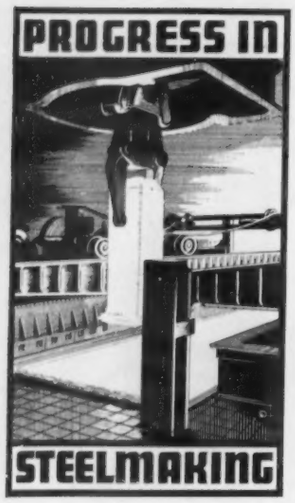
Successful operation of every machine depends upon the qualities of a *microscopic coating of oil* which prevents metal-to-metal contact.

SOCONY-VACUUM

Industrial Service and Lubricants Help to Lower Costs by

Correct Lubrication

GARGOYLE Lubricants



Modernizes Hand Mill

New automatic cut-to-length and doubling line includes many features. New electromagnetic weighing device affords instantaneous check on sheet weight. Looping device takes care of length discharged from coiler during shearing

■ MANY INTERESTING features are embodied in the modernized sheet hand mill and new galvanizing plant recently placed in operation by Bethlehem Steel Co., Seneca division, at Lackawanna, N. Y. Two new modern hot-dip galvanizing lines have a monthly capacity of 3000 to 3500 tons. Also about 10,000 tons of black quality sheets can be turned out every month in the mechanized, 2-high, hand sheet mills which have been modernized and equipped to use hot rolled strip breakdowns from the local continuous strip mill.

Black quality sheets, in lengths up to 144 inches, are produced in gages from 10 to 30; widths up to 60 inches are available in the heavy gages and 36 inches maximum in 30-gage Breakdown strip, in coils from 24 to 61 inches wide and 0.056 to 0.031-inch thick is delivered to a storage building with a capacity of about 3500 tons. Coils weigh from 5000 to 6000 pounds each. They are placed on a 30-foot roller table and delivered to an upender discharging to a tilt which places them on a ramp leading into a coil box. End of coil is inserted into a combination pinch roll and roller leveler machine where the strip is uncoiled to pass over a 17½-foot table to an up-cut shear. There a looping device takes care of the length discharged by the uncoiler while the strip is stopped for shearing. This helps to eliminate shock on the motor adjusted stop.

Cut sheets are discharged to a roller conveyor at floor level which takes them to a platform scale. Then they go to the pack heating furnaces. Capacity of the cutup line is 11 tons per hour. It handles coils from 23½ to 62 inches in width; average is about 29 inches. Maximum thickness that can be cut is 0.1875-inch.

When the line is set for a particular gage length, the weight is checked periodically. The operator presses a push button in the pulpit, an electromagnet is energized and the sheet passing under the magnet is lifted off the line and weighed accurately. The weight is registered on a dial easily read from the pulpit. De-energizing the magnet drops the sheet back on the table. Thus cut breakdowns can be weighed at frequent intervals and the length varied to insure accurate final weight. Normally about six checks are made for each coil.

Controls Centralized

All controls are located in a central pulpit adjacent to the line. From this point the operator manipulates up-cut shear, shear stop, motor driven gage bar and electromagnetic scale.

Sheets to be cold doubled are taken from the cutup line, stacked in a 20-foot space ahead of a 17-foot roller table equipped with a motor operated stop and then fed by hand into a pinch roll ahead of this table. The motor operated stop retains the sheets on the table until either two or three sheets have been stacked together. They then are permitted to pass on to the doubler where they are made into fours or sixes. No eights or twelves are made in routine operation. Capacity of doubler is about 1200 packs per 8-hour turn.

As the pack enters the doubler it is centered under the guillotine type doubler knife by air operated guides. Knife is chromium plated to prevent scratching strip surface. Double packs finally are discharged to a platform scale for weighing before they are transferred to the pack-heating furnaces.

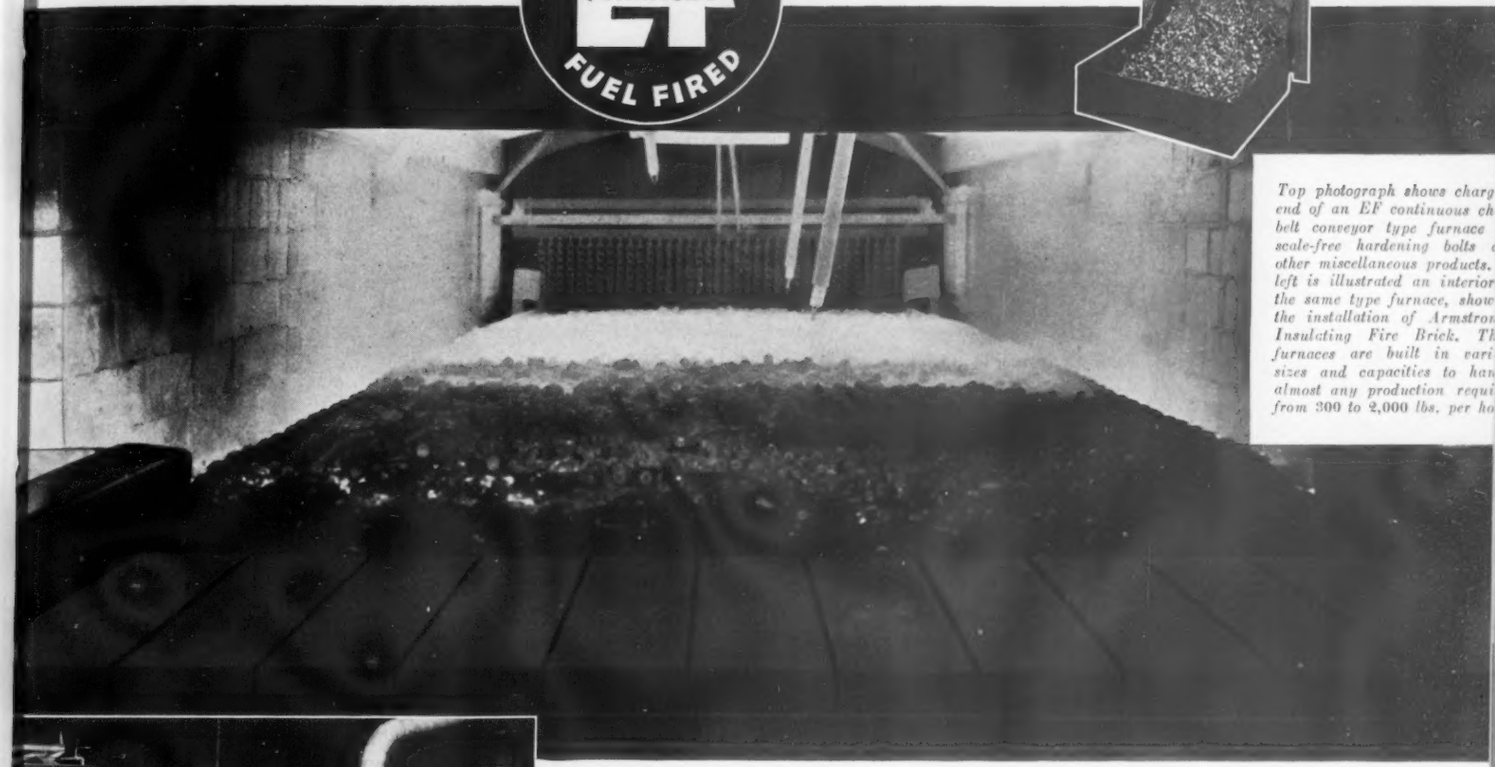
If desired, cutup line and doubler may be connected by a portable table. However, due to the difference in the capacity of the two units

View of breakdown coil cutting-up line showing electromagnetic scale and control desk in foreground

ARMSTRONG'S BRICK

Cut fuel costs, help assure more uniform temperatures

IN THESE MODERN ELECTRIC FURNACES FUEL FIRED FURNACES

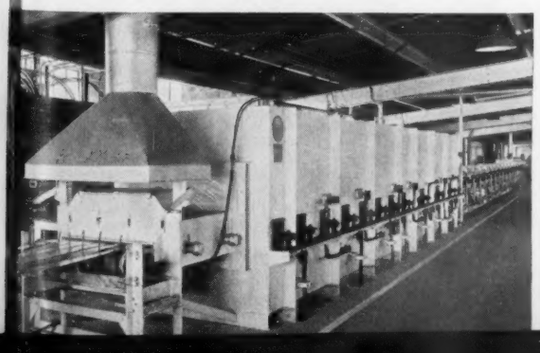


Top photograph shows charg end of an EF continuous ch belt conveyor type furnace scale-free hardening bolts other miscellaneous products. left is illustrated an interior the same type furnace, show the installation of Armstron Insulating Fire Brick. Th furnaces are built in vari sizes and capacities to han almost any production requi from 300 to 2,000 lbs. per ho

ABOVE: *This special atmosphere, continuous bright annealing furnace is one of several gas fired, radiant tube furnaces recently placed in operation by The Electric Furnace Co. It is insulated with Armstrong's Insulating Fire Brick for maximum efficiency and economical operating costs.*

~ ~ ~

BELOW: *Charging end of an EF continuous atmosphere electric furnace for bright annealing cold rolled steel in strip form. Like the other furnaces shown here, it has the efficient insulation of Armstrong's Brick.*



DESIGNED and built by The Electric Furnace Company, Salem, Ohio, these furnaces have the efficient, money-saving insulation of Armstrong's Insulating Fire Brick.

Chief among the advantages of Armstrong's Brick are: low thermal conductivity, high crushing strength, high spalling resistance, and lightness in weight. The exceptionally high insulating efficiency of these brick is the result of the fine cellular composition produced by burning out finely ground cork particles. Their use assures lower fuel costs, more accurate temperature control, and increased operating efficiency. That is why Armstrong's Brick are the choice of so many leading furnace manufacturers and plant operators.

For engineers wishing to make open specifications for high temperature insulation, Armstrong will gladly furnish complete specifications outlining the standards required for the different physical characteristics with permissible tolerances. Write today for samples, prices and descriptive literature. Armstrong Cork Co., Building Materials Div., 985 Concord Street, Lancaster, Pa.

IMPORTANT FEATURES OF ARMSTRONG'S BRICK

1. Ample insulating value
2. High crushing strength
3. Accurate sizing
4. High spalling resistance
5. High salvage value
6. Complete line for wide temperature range
7. Ability to withstand handling in shipping and installing
8. Special shapes of all types and sizes
9. Easily cut on the job
10. Stocks available in principal cities
11. Laying cements with same physical characteristics as brick
12. Complete line of refractory facing cements for protective coatings.

Armstrong's
HIGH TEMPERATURE INSULATION

INSULATING FIRE BRICK
HIGH TEMPERATURE BLOCK
PLASTIC CEMENTS
DIATOMACEOUS EARTHS

it is generally more advantageous to run them separately and stack the sheets from the cutup line ahead of the doubler.

Seven pack-heating furnaces, five in one group and two in another, heat the cut-to-length break-down strip prior to rolling. Normally four furnaces will handle the output. Two are single-chamber type with 87-foot x 72-inch hearth area. One of these has a 3-chain conveyor and is used for packs 22 to 66 inches wide, while the other has a 2-chain conveyor and takes 20 to 56-inch packs. Two other furnaces in the group of five are double-chamber type with 55-foot x 72-inch hearth area and a 2-chain conveyor in each chamber. The fifth furnace in the group and the two furnaces in the second group are all of the single type with a hearth area 51 feet x 72 inches.

Bound in Steel Plating

Pack heating furnaces are built of refractory brick bound in steel plating with insulated sides and insulated roof of sprung-arch design, and are fired with gas from three bituminous-coal gas producers. Two producers are required for full operation, the third serves as a spare. The double furnaces have two burners in each chamber, the 87-foot single furnaces have four burners, and the 51-foot single furnaces two. Alloy steel is used for all conveyor parts on the furnace hearths.

For proper heating, fuel input is controlled automatically by thermocouples and pyrometers. Temperature is normally maintained at 1500 degrees Fahr. Fuel-air ratio also is controlled automatically. To facilitate regulation of gas flow to furnaces, gas main pressure is kept constant with a maximum variation of plus or minus 0.05-inch of water.

Seven 2-high sheet mills with 29-inch rolls are arranged in front of the furnaces. Five of these form a group driven by a 1700-horsepower motor at a speed of 30 revolutions per minute; the remaining two are driven by a 1200-horsepower motor. Four mills in the first group are equipped with full mechanized feeder and catcher tables while the other three stands operate as conventional hand sheet mills. Each mechanized mill has a rated capacity of 30 tons per 8-hour turn. The four mechanized stands are equipped with mechanical conveyors for handling the hot packs between furnace and feeder table. On the double furnaces and the 3-chain single furnace, conveyors are herring-bone design to center packs on the mechanical tables ahead of the mills. A single conveyor is used for the 2-chain single furnaces.

Packs of cold sheets are placed by hand on conveyor at charging end of heating furnaces. When a pack is required at the mill, the roller pushes a single control button at discharge end, furnace door opens, chain conveyor starts and a heated pack is discharged automatically toward the mill. At the same time a cold pack is charged at the other end, and the door is closed automatically. Packs move slowly through the furnace which is of sufficient length to insure uniform heating at correct temperature.

Preheating of the rolls to attain correct rolling temperature is accomplished by electric roll heaters. Power outlets for these heaters have been provided both at the mill and at the roll racks. Shape of rolls during rolling is maintained by gas or steam, as local heating or cooling is required. Stands also are equipped with automatic roll polishers which maintain a good roll surface as an added insurance of good surface on the finished sheets.

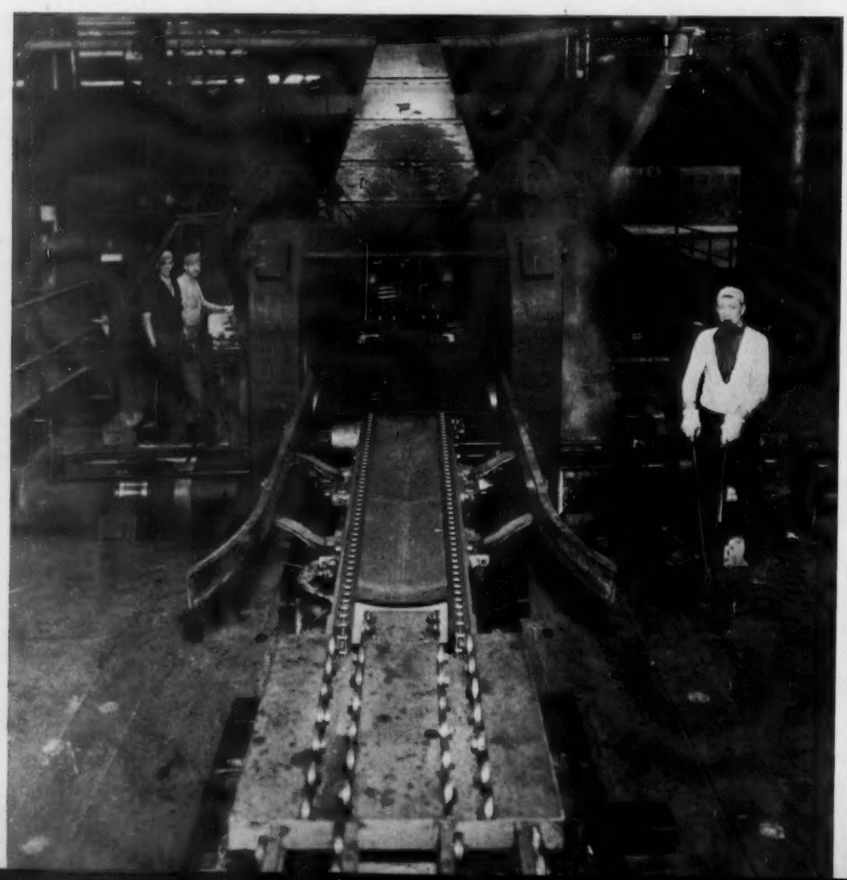
In ordinary operation, sheets of 18 gage and heavier are matched, heated and finished in pairs. Sheets of 20 to 24 gage inclusive are rolled and finished in one heating, in packs of four, starting with two sheets and cold doubled into a pack. For products of 26 gage, cut sheets are matched in threes, doubled cold and finished in one heating, in packs of six. Sheets lighter than 26 gage are matched cold in fours, heated, rolled, then hot doubled into packs of eight for a second heating and final rolling. Hot doubled packs to be reheated are returned to the charging end of the furnace by a motor driven, inclined chain conveyor. Usual practice is to roll hot doubled material on mills served by the double furnaces, using one chamber for cold and the other for hot-doubled packs.

Carried by Gravity Conveyor

After the final pass, the finished packs are carried by gravity conveyor to a tilting mechanism which deposits them on a motor driven, chain type cooling conveyor leading to a squaring shear. A separate shear with conveyor system is provided for each of the mechanized mills.

Driven cooling conveyor is 55 feet long and is arranged so it moves forward the length of a pack each time a new pack is deposited on it by the tilting mechanism. From the cooling conveyor, the packs travel over a castor ball table to the 156-inch squaring shear where they are trimmed to size, opened and stacked. Before shearing they have cooled to a point where they can be handled without discomfort.

A large percentage of the sheets are further processed by annealing, cold rolling, normalizing and leveling, if required, and sold as black sheets, while the balance of the production is diverted to galvanized products. Annealing equipment consists of two groups of in-and-out furnaces, fired with Bunker C fuel oil, fourteen in one building and five in another. With the latter group are also two portable annealing covers, each equipped with four bases and inner covers. One of these is of the



Looking at the mechanized 2-high sheet mill from the catcher side

gas fired, radiant tube type, the other an electrically heated unit.

All annealing furnaces are designed to heat treat a maximum of 72 x 144-inch sheets under covers, piled to a height of 54 inches. Normally a 24-hour annealing cycle is used, including 14 to 18 hours heating to about 1300 degrees. During this cycle natural gas is used for deoxidation under the covers for the in-and-out furnaces. The two portable covers are equipped with a deoxidizing machine for the production of bright annealed sheets. These also have full automatic temperature control, while on the in-and-out type of furnaces the fuel input is adjusted manually according to the temperature of the sheets as read on a potentiometer.

Nine Cold Mills Used

Nine conventional 2-high cold mills are used for skin passing the black sheets. Five of these are arranged in a group driven by a single motor, while the remaining four are arranged in groups of two. Two 100-foot normalizing furnaces, picklers, scrubbers, levelers and resquaring shears round out the auxiliary finishing equipment in the black sheet department.

Galvanizing department has a monthly capacity of 3000 to 3500 tons in the following ranges: 10 gage, 48 x 100 inches maximum size; 30 gage, 36 x 144 inches maximum size. Sheets are produced in all standard ranges of coating weights and can be made with a tight coat if desired. Formed roofing, both corrugated and V-crimp, is made in lengths up to 144 inches maximum, as well as roll roofing in standard roll lengths.

After annealing, black sheets to be galvanized are transferred to an adjacent building where they are pickled in a 32-inch, 4 arm pickler. Sheets are first placed in crates made of acid resistant metal, about 8000 pounds in each load, and then immersed in a bath of 7 to 8 per cent sulphuric acid. A second acid dip follows and finally a water wash. Soda ash is used in the wash water to neutralize any acid remaining on the sheets.

After washing, crates loaded with pickled sheets are placed on a nearby table. Here sheets are transferred to another crate, placed on a driven conveyor and moved to an adjacent building where the crate is taken by crane and immersed in one of four 156-inch long bosh tanks filled with water containing 25 pounds of soda ash. This is done to prevent oxidation of the surface of the sheets prior to galvanizing. As they are required, the crates with the clean sheets are then moved to the feed table ahead of the galvanizing line. Light weight, cold reduced sheets from the continuous strip mill are galvanized, as well as black hand mill sheets.

Two parallel hot-dip galvanizing lines, modern in every detail with pots 106 x 90 and 60 inches deep, are installed. Ample space has been provided for four additional lines in the same building. Clean pickled sheets are first passed through a muriatic acid dip (20 degree Baume) to remove any remaining stains. After passing through a pair of rubber rolls to squeeze off surplus acid, the sheets are fed by pinch rolls through the flux box to the zinc bath where they are directed into the bottom rollers through suitable guides. Sheets are carried by bottom rollers to exit rollers at other end of pot.

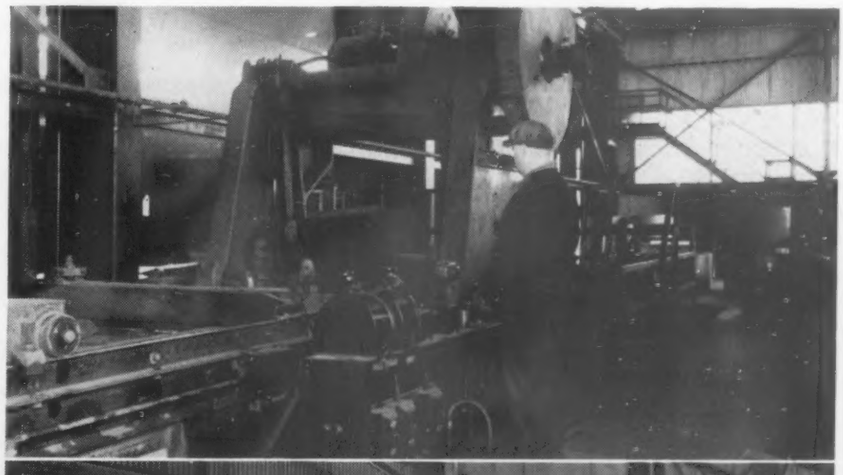
The galvanizing pot is heated with Bunker C fuel oil supplied from an oil conditioning system designed for constant temperature and pressure. Bath temperature of 810 degrees Fahr. is maintained by a thermocouple and pyrometer control system which also automatically proportions air and fuel.

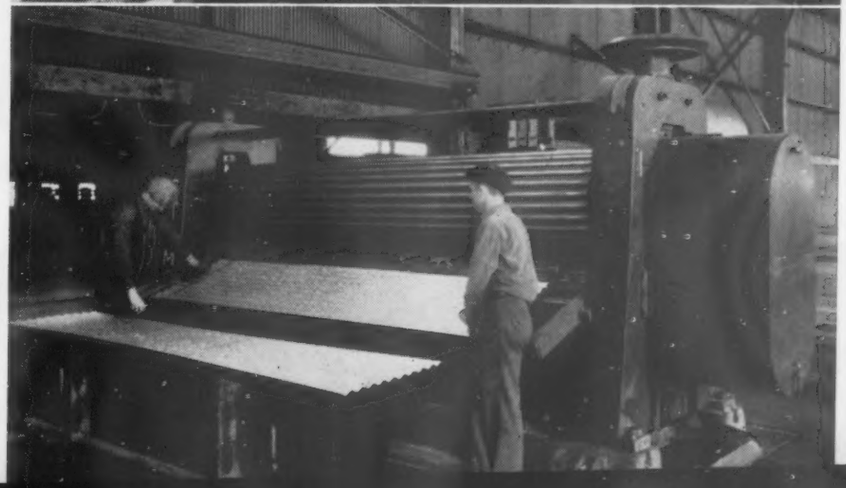
As sheets emerge from the pot they pass over two magnetic rolls and a 20-foot long, 52-inch wide spangle fence conveyor consisting of an endless wire belt of 1½-inch mesh. Next, a second fence conveyor, 40 feet long with ¾-inch mesh, cools both top and bottom by evenly spaced air jets.

At end of second conveyor, pinch rollers and guide chains feed sheets into a 10-foot rinse tank filled with water which serves both as a constant temperature medium and a cleaning agent. The water is maintained automatically at a constant temperature slightly below 160 degrees Fahr. by admitting steam or cold water into the tank as needed. This produces better results in subsequent leveling operations. Before entering the 17-roll, 2-high, roller leveler, the sheets are dried on a table 8⅓ feet long. Finally they are delivered to the warehouse and shipping department for inspection and storage.

The speed of the sheets through the galvanizing pot and on the spangle conveyor can be varied from 10 to 160 per minute. Delivery speed through cooling conveyor, rinse tank and leveler is 40 to 160 feet per minute.

Warehouse and shipping building measures 60 x 352 feet and has two 10-ton cranes. Auxiliary equipment for the processing of galvanized sheets includes a machine to form 1¼ and 2½-inch standard corrugated roofing, and No. 2, 3 and 5 V-crimp roofing; a roll roofing machine; two 156-inch resquaring shears; one 4-high roller leveler; one bundling shear; two bundling scales and one platform scale. Plant layout has been made with an eye to future extensions when needed.



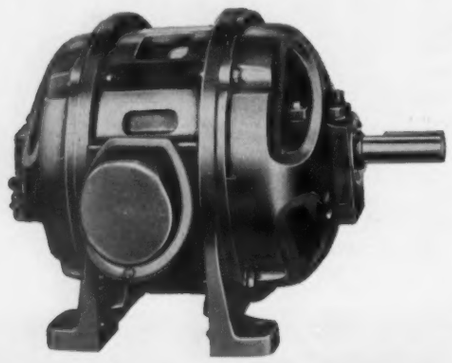


Upper view shows cold doubling machine used in breakdown coil cutting-up line. Below is the corrugating machine in the galvanizing plant

WESTINGHOUSE POINTS THE WAY

TO NEW SPEED IN PRODUCTION

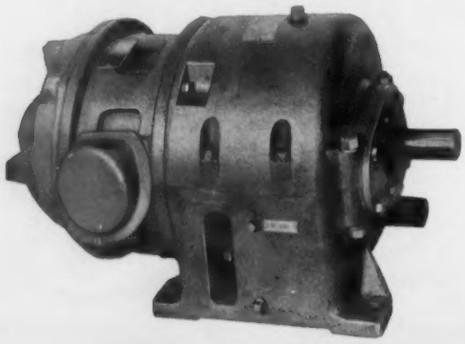
EXTRA STRENGTH AT NO EXTRA COST IN WESTINGHOUSE MOTORS . . . Extra electric strength in Tufferneil Insulation, extra mechanical strength in rigid one piece frames. Ball or sleeve bearings free from lubrication grief.



DIAMOND POINTED JAW WITH EXTENDED BLADE, confines arc to noncurrent carrying areas . . . eliminates burning and beading. Saves dressing down, saves maintenance. Ask to see it demonstrated.

WESTINGHOUSE SAFETY SWITCH

HIGH SPEED MOTOR EFFICIENCY FOR SLOW SPEED MACHINES . . . Now you can get the horsepower you want at the rpm. of the driven machine. Saves cost of separate mechanical units . . . simplifies installation, saves maintenance of belts, pulleys, sprockets or chain.



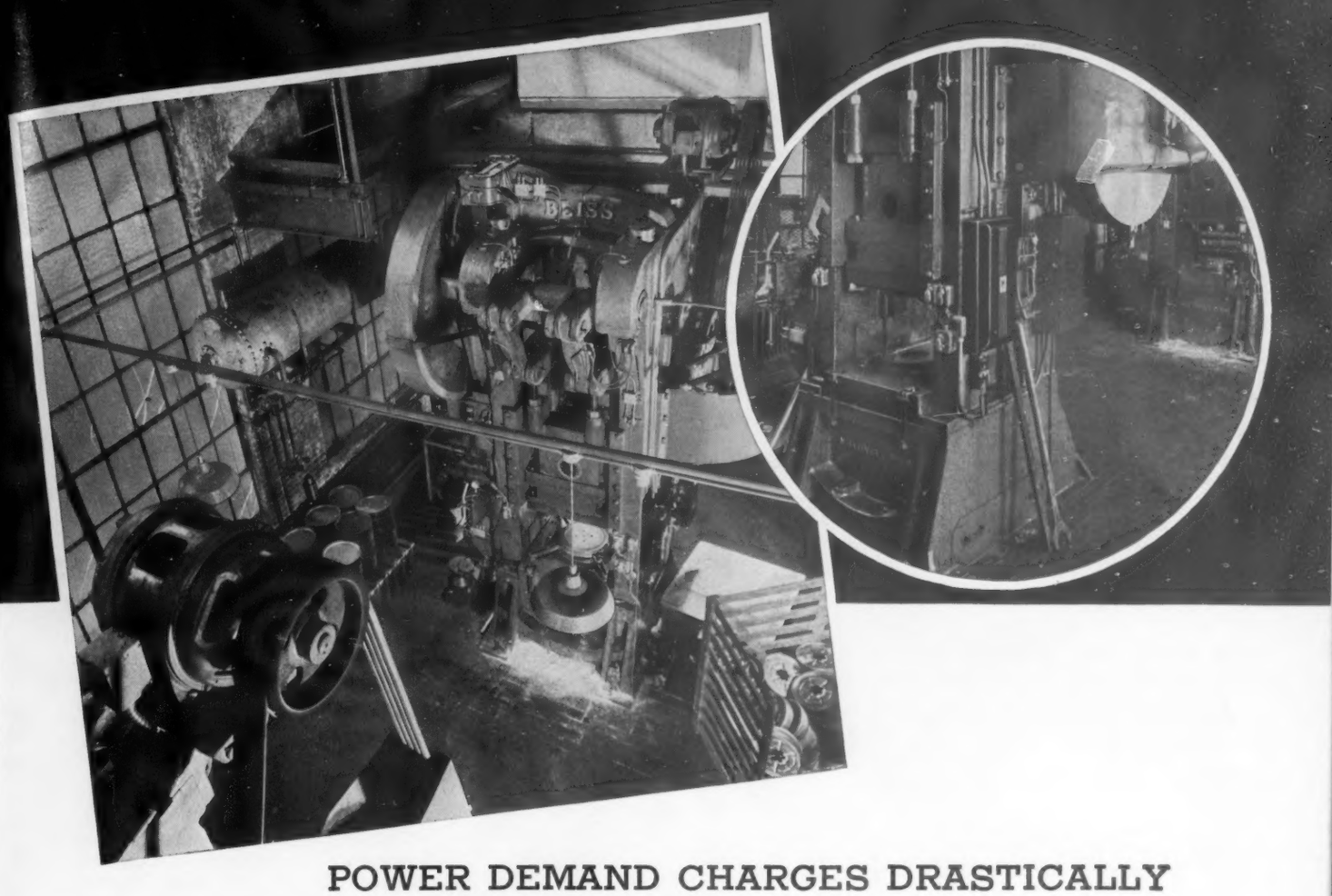
ALL NECESSARY CONTROL AND PROTECTION IN ONE EASILY INSTALLED PACKAGE. . . The Westinghouse Combination Linestarter . . . Costs less to install . . . saves wiring, conduit, labor . . . simplifies inspection.

★ ★ ★

WESTINGHOUSE COMBINATION LINESTARTER

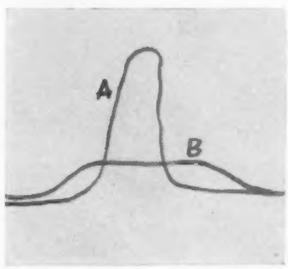
Westinghouse

W WESTINGHOUSE ELECTRIC



POWER DEMAND CHARGES DRASTICALLY CUT BY CORRECT MOTOR APPLICATION

A Westinghouse representative, making this little sketch on the scratch pad of a stove manufacturer's desk, showed him how to cut his demand charge for power in his punch press operations.



The "A" line in the sketch represents the peak load of a 25 hp. general purpose motor the buyer thought he required. The "B" line represents the power demand of a Westinghouse 15 hp. punch press motor, capable of operating the presses efficiently. Notice the saving.

Similarly, the Westinghouse representative showed how presses powered by 20 hp. motors could be better operated by 10 hp. punch press motors, and how 5 hp. presses could be operated by 3 hp. motors.

Change-overs are now partially made. When completed, savings in demand charges will be several hundred dollars a month—and these savings will accrue to the manufacturer for years to come.

In working out your own motor and control applications, consult Westinghouse. Be sure you have the advantage of modern developments in motors and control, and their efficient application. Westinghouse Electric and Mfg. Co., East Pittsburgh, Pa.

Apparatus wholesalers, industrial agents, and district offices in all principal cities.

J-90150

Motors and Control

Welded Locomotives

One piece construction obtained by welding is valuable in distributing stresses uniformly, reducing weight to power ratio as well as costs. Welded fabrications are tested accurately with synthetic loads imposed by precalibrated jacks

■ SINCE THE epoch-making trip of the first 3-car Zephyr train from Denver to Chicago's Century of Progress Exposition in 1933, a rather complete change has occurred in the construction of high speed, diesel-electric locomotives.

This is an abstract from the paper which received the second award, $2,543.88, in the Railroad classification of the $200,000 Award Program sponsored by the James F. Lincoln Arc Welding Foundation, Cleveland.

By JOHN H. HRUSKA
Metallurgical Engineer
Electro-Motive Corp.
La Grange, Ill.

Former construction of car and locomotive bodies has been supplanted almost entirely by welded assemblies. Accumulative experience gained in the daily performance of the many diesel-electric speedsters under strenuous schedules not only resulted in practically complete acceptance of the welded joint, but also in its use at practically all points in the locomotive structure.

Main advantages of welded construction in high speed or heavily scheduled locomotives appear to be: Uniform distribution of stresses throughout the car body, marked reduction of locomotive weight in reference to its power output, adoption of stronger materials for car body construction, decreased cost of production, a stronger and more ductile bond between the joined members, neater appearance, much better resistance of joints to repeated stresses at ordinary and subzero temperatures, and easier cleaning and painting.

Welding Standard Is High

Welding technique applied in the construction of modern car bodies follows the highest standards as dictated by the fundamental necessity of absolute safety. After being carefully dimensioned and checked theoretically for the various loads it is to carry under most trying conditions, the body is constructed in its various principal parts and then assembled.

Car base or underframe consists of a series of specially designed beams welded to two long Z-bars. Rather simple fixtures for the exact location of the parts are being used in assembling the base structure. All work is carried out on six welded supports, permitting easy access

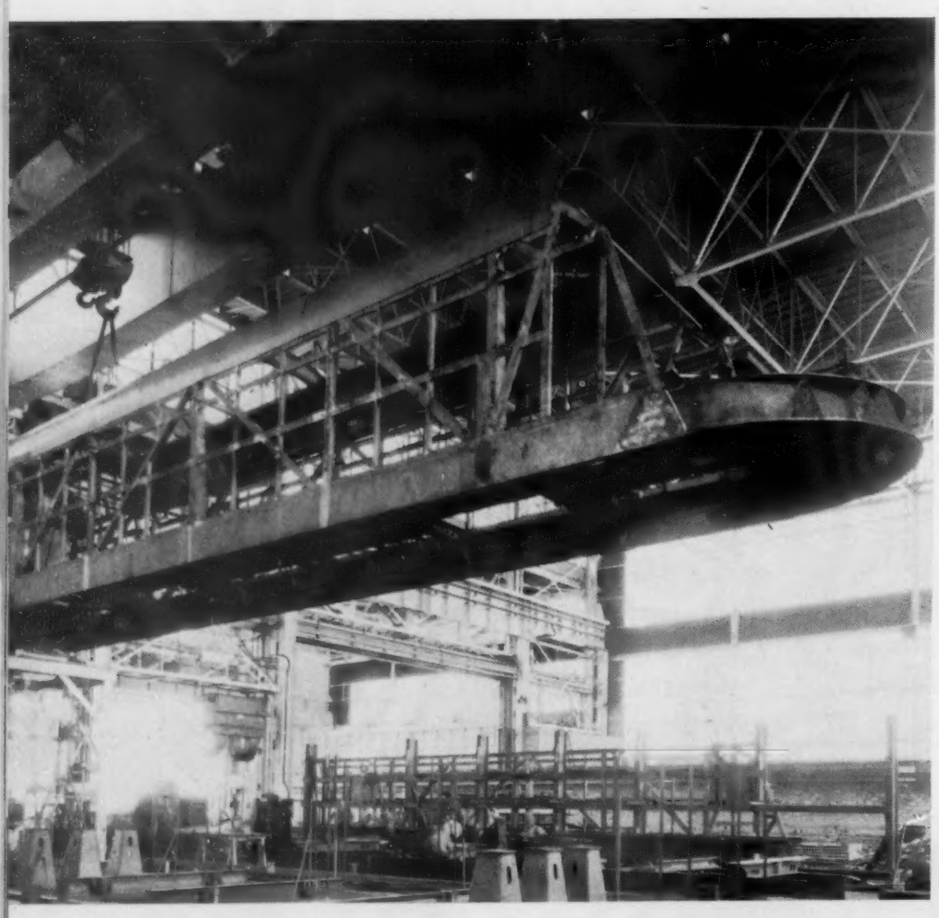


Fig. 1—An all-welded locomotive frame lifted by a 200-ton welded crane in a welded factory building, Electro-Motive Corp., La Grange, Ill.

IT PAYS TO ASK THE MEN WHO KNOW

The manufacture of a spring form does not always run as smoothly as planned.

The spring shown above is a typical example. The designer specified annealed wire to withstand the sharp bends, relying on subsequent heat treatment to impart spring temper. Brittleness was encountered in the finished piece. Then a sample was sent us. Wickwire Spencer experts immediately recognized a known difficulty and recommended a wire slightly cold worked after annealing that would form successfully and possess excellent spring quality after final heat treatment.

Manufacturers are urged when planning production to send in a wire form or spring and description of its use for our recommendation as to the correct wire to be used. This service costs you nothing yet may save you endless trouble, delay and expense in struggling with a problem that our engineers have successfully met again and again.

WICKWIRE SPENCER STEEL COMPANY

New York City, Buffalo, Chicago, Detroit, Worcester. Pacific Coast Headquarters: San Francisco. Warehouses: Los Angeles, Seattle, Portland. Export Sales Dept.: New York

Wickwire Spencer manufactures High and Low Carbon Wires—in various tempers, grades and finishes—for your specific purpose. Hard-Drawn, soft or annealed Basic or Bessemer Wires—Hard-Drawn annealed, or oil-tempered Spring Wire, Chrome Vanadium Spring Wire — Valve Spring — Music — Clip — Pin — Hairpin—Hook and Eye—Broom—Stapling—Bookbinding—Dent Spacer Wire — Reed Wire — Clock — Pinion — Needle-Bar—Screw Stock—Armature Binding—Brush—Card—Florist—Mattress—Shaped—Rope—Welding. Flat Wire and Strip Steel, High or Low Carbon—Hard, annealed or tempered—Clock Spring Steel—Corrosion and Heat Resisting Wires. Consult the Wissco technical man on your wire problems, however large or small.

WISSCO WIRE
by Wickwire Spencer

to all parts above and below the fabricated base.

Side frames are similarly welded together on carefully proportioned welding fixtures, care being taken to allow for shrinkage to finished dimensions. Some conception of this important consideration will at once be apparent when reviewing side framework visible in Fig. 1.

Transverse deformative strains caused by the static loading of the under and side frames are mainly taken up by an especially constructed roof which permits elastic longitudinal deformation between the bolsters, but which is practically rigid in planes perpendicular to it. In many cases, the roof is covered with 12 gage, columbium treated, 18-8 stainless steel. Other cars are topped with 12 to 14 gage steel of the nickel-copper type.

Body Assembly Begins

After completion of the two side frames and the roof, actual assembly of the car body commences. One side is first removed from the welding jig and welded in an upright position to the base frame. Careful positioning is maintained by tie rods tacked to the two frames. The other side is similarly connected to the base. While all the tie rods remain in proper location, the roof is finally welded in place. After adding the end sheets and additional crossrods, gussets, etc., the tie rods are removed and minor parts such as brackets, pipe clamps, fan frames and similar items welded in place. The front is built up before installing the engines, generators, blowers, pumps and auxiliary equipment.

The "nose" of the modern diesel-electric streamliner has been patterned appropriately according to experiences gained in automotive design. As in the roof construction, a framework is fabricated first upon which the properly shaped front sheets are welded. Entire body then is shot blasted, inspected and repaired if any doubt exists as to quality of any weld.

In the meantime, fuel tanks, water tanks, sand boxes and battery boxes have been manufactured by arc welding and tested for possible leakage by experienced inspectors. These items are welded to the frame, thus fairly completing fabrication of the car. Hatches are being finished—also by welding—and are being applied after the power plant, wiring, piping are finished. These operations are completed by setting the car with its contents over two trucks. Electrical connections and some piping only are necessary to enable the testing engineers to attempt the first trial run. Painting and trimming are then applied before final inspection, more testing and shipment.

Entire car body of diesel-electric switchers is of arc welded construction. Mechanical joints are used only for parts requiring frequent removal, all permanent joints being made by butt or fillet welds. Wherever water-tight construction is desired, continuous welds are applied.

Without doubt, the largest all-welded part of the modern switcher is the underframe, the size of which may best be realized from the weight of this part of the car body. The unit for a standard 100 ton, 600 horsepower car weighs about 28 tons, whereas the 125 ton, 900 horsepower diesel switcher has an underframe weighing about 44 tons.

Underframe for the 600-horsepower car is a steel plate 40 feet long, 10 feet wide and 2 inches thick, to which two center sills 40 feet long, 7 inches wide and 3 inches thick besides two side sills 36½ feet long, 7 inches wide and 2 inches thick are welded. The 900-horsepower frame is produced from two 4¼-inch plates which are joined by two, single bead, automatic, butt welds. In order to eliminate any possible cracking of the welds due to an internal notch effect, the beads overlap thereby representing actually one solid piece of metal. Fillet welds of the sills are continuous on both sides.

Welding Stresses Controlled

Welding stresses and deformation are eradicated by a carefully controlled heat treating process in a large gas-fired furnace. Straightness of frames after heat treatment must be within 3/16-inch over the top surface, which requirement facilitates the alignment of the engine, generator, fans, etc., during the subsequent assembly of the power plant. Both ends of the underframe are later equipped with all-welded coupler pockets welded to the frame in an inverted position.

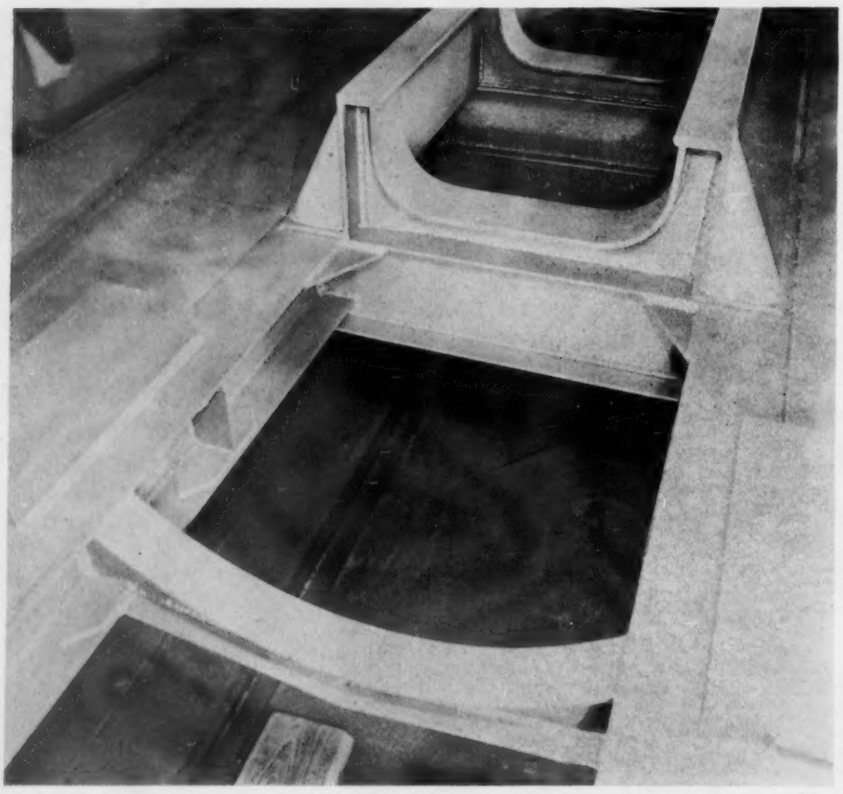
A 1½-inch bolster web together with a bottom plate, 40 feet long, 3½ feet wide and 2¾ inches thick, then are welded to the center sills. All steps and the 1½-inch thick end plates are finally welded to the main structure of the underframe. All exposed welds are ground flush with portable grinding disks.

A final inspection is made of all joints before the frame is turned over to the assembly department. There the base is placed on suitably designed welded supports which permits convenient access above and below the top surface. Next comes installation of the welded engine bed, welded cab, fan housings, etc. A hood, 26 feet 9 inches long, finally encloses entire locomotive power plant.

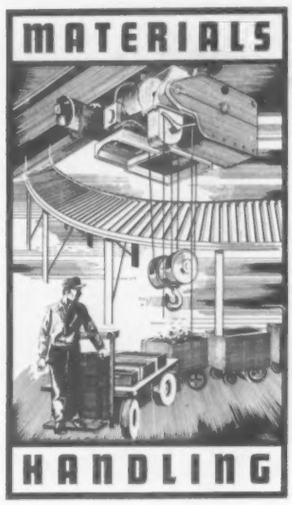
In the wake of design calculations, engineers and metallurgists have conceived a procedure of ascertaining actual conditions by imposing

(*Please turn to Page* 81)

Fig. 2—Section of an all-welded engine bed



ADVERTISING PAGES REMOVED



Coil Conveyors

Special coil handling conveyor units greatly facilitate operations at new plant, permit smooth flow of large volume of material, protect coils in process, allow flexible routing of steel through processing operations

■ AMONG THE many items of new equipment installed at the new Irvin Works of Carnegie-Illinois Steel Corporation near Clairton, Pa., are several interesting developments in roller conveyors and associated equipment.

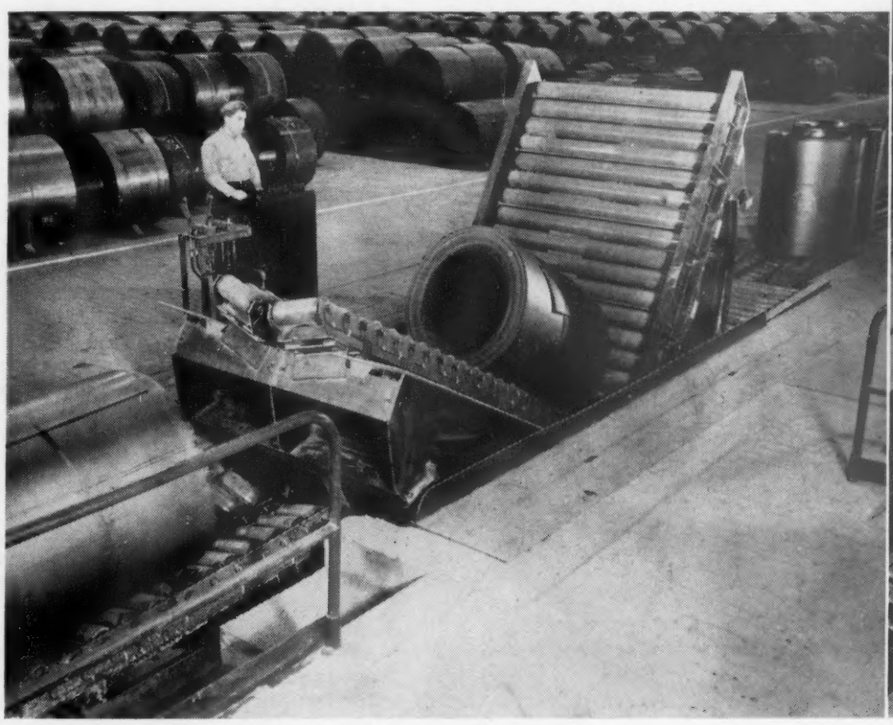
There are a number of heavy duty roller conveyors handling coils in various parts of the mill. For instance, the two coiling units at the end of the 80-inch continuous hot strip mill deliver hot coils on end to a short inclined section of chain conveyor which transfers them to the main cooling conveyor. This is a 1274-foot chain conveyor which carries the coils over scales to the raw coil storage area.

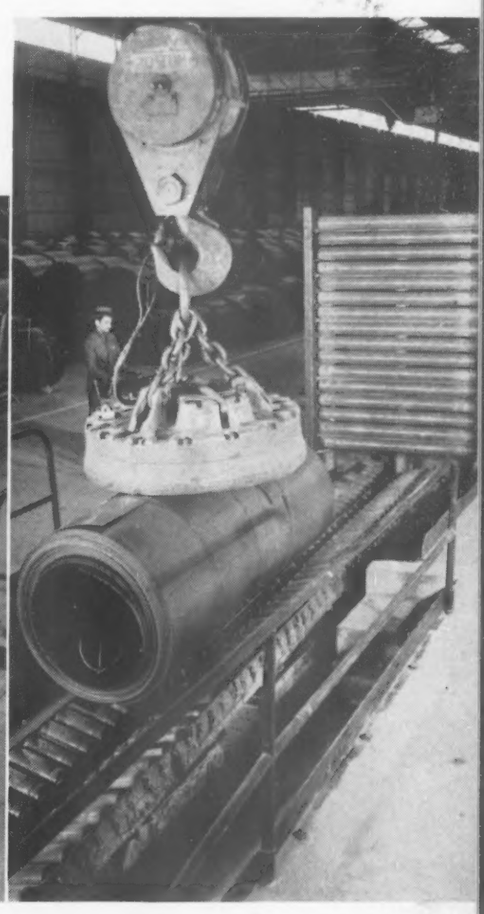
Downtilters discharging right and left are installed midway along the cooling conveyor, and another at the end of the line transfers the still warm coils to a special short section of roller conveyor (shown in Fig. 1). This feeds the coils, still on end, to the downtilter in Fig. 1 which tips them from the straight rolls to a trough type roller conveyor section which is part of the mechanism.

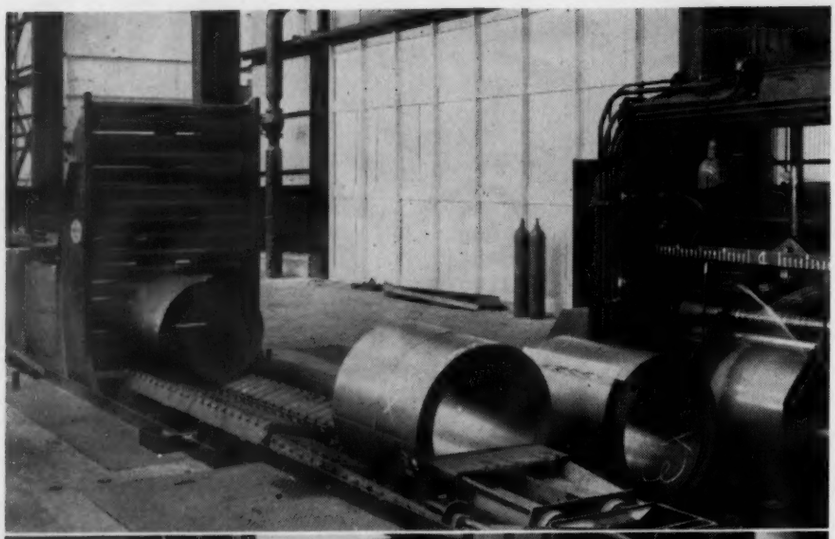
The horizontal coils are then advanced into another trough type conveyor equipped with air brakes to hold the coils in position to be picked up by a crane magnet for transfer to the adjoining storage areas as shown in Fig. 2. Rollers in this conveyor unit are 5 inches in diameter and spaced on 6-inch centers. All rollers are equipped with ball bearings.

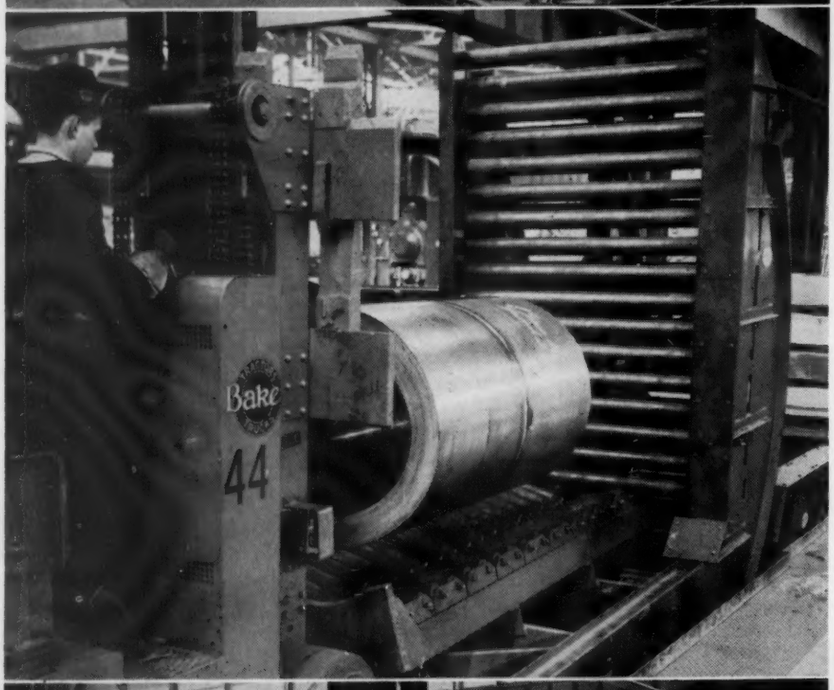
Coils to be pickled are lifted from storage by a crane equipped with a special coil handling mag-

Fig. 1. (Left)—Downtilter at end of 1274-foot main coil cooling conveyor. Fig. 2. (Right)—Crane magnet picking up coils from the roller trough conveyor to which the downtilter shown in Fig. 1 discharges. Photos courtesy of Mathews Conveyer Co., Ellwood City, Pa.









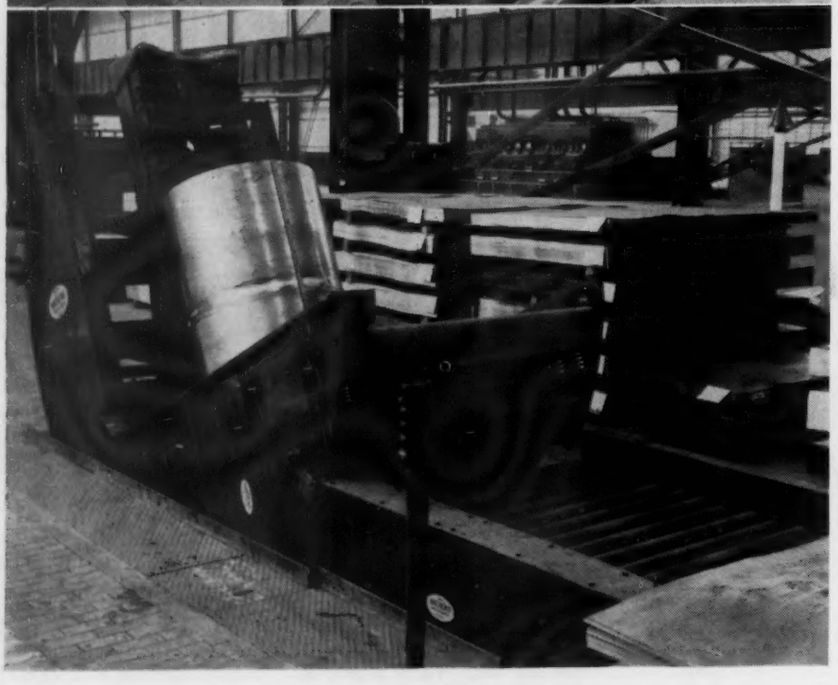


Fig. 3. (Top)—Downtilter, side tilter and uncoiler at entry end of the 80-inch continuous pickling line. Fig. 4. (Center)—Ram truck depositing pickled and cold reduced coil on tilter to be positioned for crane magnet transfer to special car which moves coils to the annealing department. Fig. 5. (Bottom)—Individually spring mounted rollers on coil tilter shown in Fig. 4 prevent coil end marking. Photos courtesy Mathews Conveyer Co., Ellwood City, Pa.

net and taken to the continuous pickling lines. Fig. 3 shows the downtilter at the entry end of the 80-inch continuous pickling line. This unit positions the coils on a trough conveyor section which allows the coils to roll by gravity against the adjustable spring bumper shown in the immediate foreground of Fig. 3. The bumper centers the coils on the pass line feeding the pickling line. This bumper and short trough conveyor section are part of a side tilting mechanism which feeds the coils directly into the uncoiler at the entry end of the continuous pickler.

All the conveyors and tilters de-

(*Please turn to Page* 80)

•

Patent Tactics, Law for Industrial Executives

■ *Patent Tactics and Law,* by Roger Sherman Hoar; cloth, 315 pages, 5¾ x 8½ inches; published by Ronald Press Co., New York; supplied by STEEL, Cleveland, for $4.50; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London, S. W. 1.

A revised edition of a previous volume, *Patents,* this volume has been completely rewritten in the light of 12 years of intensive use, with footnotes containing illustrative cases.

The author gives careful treatment of patent tactics with sound analysis and interpretation as a basis for a common ground between executive and attorney in solving a patent problem. Experience has taught that such an understanding places a company in better position for obtaining a valid patent.

He offers valuable advice and practical suggestions on the effective legal procedure for securing patents; shows clearly what a patent is and what it is not; what is patentable; outlines procedure in making searches. It shows how to organize a patent department and protect patents here and abroad. There is comprehensive explanation of business aspects involved, evaluation of patents and patent licenses, how to carry these values on the books and how to account for them for tax purposes.

How to Avert Accidents and Prevent Breakdowns

Fig. 1645
Pat. App. for

Equip your machines with UNBRAKO

Fig. 1641
Pat. App. for

SELF-LOCKING HOLLOW SET SCREWS
with the Knurled Points

Here are the set screws that cannot loosen up in service . . . that cannot cause trouble by failing to perform their intended duty. So cleverly have they been knurled around the cup points that by merely tightening them in the normal way, they are securely and automatically locked in place. This not only eliminates the possible breakdowns that might follow a set screw's vibrating loose, but it makes frequent check-ups unnecessary.

Removal for adjustments is easily done with the customary wrench and the Knurled Self-Locker can be used again and again.

These "Unbrako" Self-Lockers have been carefully and thoroughly tested in many different plants and under varied conditions. The results substantiate our every claim.

Send the coupon for complete information and samples.

Fig. 1646
Pat. App. for

There's STRENGTH and DEPENDABILITY

in the new Knurled Point UNBRAKO **Self-Locking Square Head Set Screw**

Industry has used and liked "Unbrako" Square Head Set Screws for years and now they, too, can be had with the automatic self-locking feature provided by the knurled cup points. These hold tight even under the most severe vibration but can be adjusted frequently, as desired, without impairing their locking effectiveness in the least.

Use the coupon below to secure further facts and figures about them.

STANDARD PRESSED STEEL CO.

BRANCHES
BOSTON
DETROIT
INDIANAPOLIS

JENKINTOWN, PENNA.
BOX 579

BRANCHES
CHICAGO
ST. LOUIS
SAN FRANCISCO

Send me all the facts about

☐ "UNBRAKO" Self-Locking Hollow Set Screws.

☐ "UNBRAKO" Self-Locking Square Head Set Screws.

MR.....TITLE.....

FIRM.....

ADDRESS.....

NEW METAL PRODUCTS

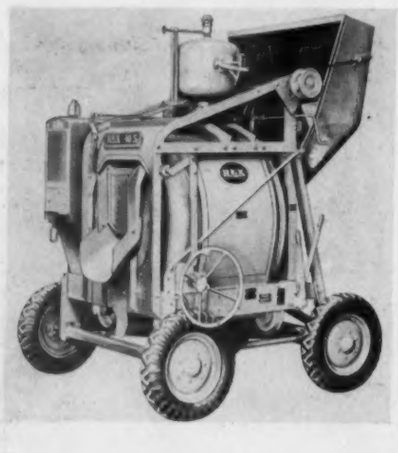
■ Said to be the largest regularly manufactured trucks in the world, two super duty models, rated at 50

and 23 tons gross, have been introduced by Mack Trucks Inc., Long Island City, N. Y., for open pit mining, quarrying and similar "off the road" operations.

The FC six-wheeler is rated at 100,000 pounds gross vehicle weight and has a net payload capacity of 30 tons; as a four-wheel truck this model has a gross rating of 60,000 pounds and payload capacity of 15 tons. The other model, called the FJ, is a four-wheel truck rated at 45,000 pounds with payload capacity of 11 tons. All three of these units are chain driven and can be obtained with either gasoline or diesel power plants. Typical of the huge proportions of the main structural elements in these trucks is the rear axle, a massive forging of heat-treated, chromium nickel steel bored out to form a tube, with an outside diameter of 6½ inches on the FC and 5⅝ inches on the FJ.

■ A complete new line of Rex concrete mixers has been brought out by Chain Belt Co., Milwaukee, in the 3½-S, 5-S, 7-S and 10-S sizes, and in 2-wheel, end-discharge and 4-wheel, side-discharge models.

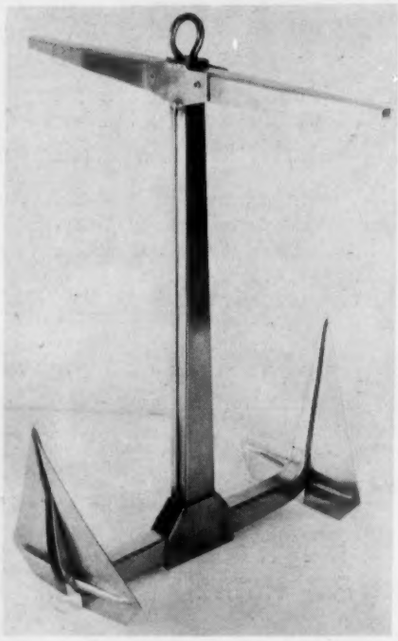
The three largest sizes use an improved drum of all-welded construction with pressed steel drum



head and center strip welded together to form a stronger, lighter unit. Mixing blades and buckets are high carbon steel which is resistant to abrasive wear. Each machine has full-view, one-man end controls.

These mixers are driven by all-steel chains with case hardened pins and bushings, heat-treated rollers and side bars. Chain rolls smoothly onto the pressed steel sprocket teeth with a roller bearing action designed to defeat friction and wear.

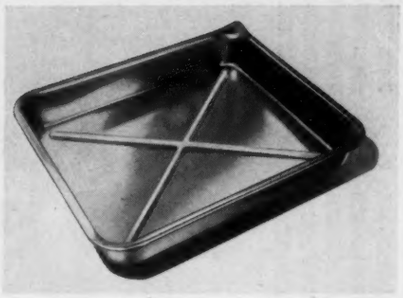
■ One of the latest developments in the marine accessory field is a lightweight, folding anchor fabricated from monel sheet. Designed by Youngstown Welding & Engi-



neering Co., Youngstown, O., this anchor is welded throughout, except where the arms and stock meet the shank. These joints are pinned so that the anchor can be folded for stowing when not in use.

Anchor is made in sizes from 6 pounds to 47 pounds and is so designed that the 11-pound size will hold a 38-foot boat. Arms are set at right angles to the stock and are fitted with a set of sharp triangular flukes. These dig depeer and deeper as pull of the craft is increased. Anchor will not dig itself out of the bottom until a direct upward pull is exerted on the line. Unit will not rust or corrode because of its monel construction.

■ Typical of the many adaptations of stainless steel to photographic equipment is this new tray, a product of Columbian Enameling &

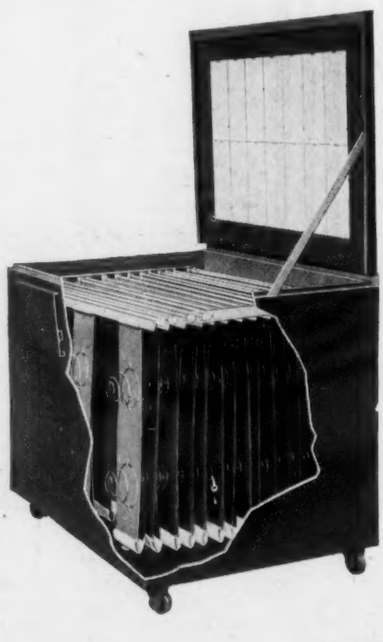


Stamping Co., Terre Haute, Ind. Made of Enduro low carbon, molybdenum steel, these trays are resistant to the corrosive action of developing agents, toning solutions, silver nitrate baths, hypo and other photographic chemicals. Trays are available in 8 x 10, 11 x 14 and 16 x 20-inch sizes.

Other manufacturers of photographic equipment have adapted stainless steel for such applications as tanks, developing reels, clips, print boards and camera parts.

■ A practical system of vertical filing for mechanical drawings is provided by the Planfile, a product of Art Metal Construction Co., Jamestown, N. Y. As many as 5000 separate sheets may be suspended within its allsteel cabinet. Drawings, folders and pockets that contain them do not come in contact with the walls, cover or floor of the unit at any point.

Free moving rollers facilitate removal and insertion of both drawings and folders. A collapsible shelf on the front of the cabinet snaps into position with the top of the unit to form a convenient surface for tracing or reference to drawings without removing. An index shows location and classification of each drawing by number, pocket and folder.



LEWIS IMPROVED 3 HIGH MILL

NEW DESIGN • FAST RESPONSIVE . . .

A MILL THAT CAN BE OPERATED PROFITABLY UNDER ALL CONDITIONS

ewis Balanced Three High Mill with motor perated screwdown, pre-set control and roller nd catcher tables.

LEWIS

LEWIS FOUNDRY & MACHINE

DIVISION OF BLAW-KNOX CO.

PITTSBURGH, PA.

Conditioning Mill Rolls

(*Continued from Page 49*)

wheels 8 to 180 grit, 1.2 diamond dressings per roll; ultra-finish rolls, wheels 220 to 800 grit, one diamond dressing per roll. Dressing can be over-done. Unless a wheel is badly loaded, 0.001-inch dressed off will resharpen it.

Many defects in the surface and finish of steel mill rolls are due to faulty wheel dressing. To prevent chipping by the dressing tool and traverse marks, both of which would harm the surface of the roll, wheels finer than 60 grit should be rounded at the edges both before and after dressing. A coolant should be used freely while dressing to prevent particles from lodging in the pores of the wheel.

When a wheel is coarsely dressed, some of the abrasive grains may be loosened only partly instead of removed from the wheel. When these particles come in contact with the work they will tear loose and roll between the wheel and the work, causing serious scratches and fishtails. The same result may come from a dull dressing tool. When grinding ultra-finish rolls, the wheel should be scrubbed thoroughly with a stiff brush and clean water after each dressing to remove any partly lossened particles.

Diamond marks caused by improper dressing will certainly be reproduced on the roll and transferred to sheets or strips. They are usually caused either by too rapid traverse when dressing or too deep penetration by the diamond. Since few roll-grinding machines have a power traverse slow enough for proper dressing, it is best to use the hand traverse if practicable. To prevent deep diamond marks, use a fine infeed. Also traverse during dressing in a direction opposite to that used in subsequent grinding operations.

Dressing is usually done at a point on the roll-grinder somewhat removed from the grinding position. Since the machine ways are not worn the same at the two points, the normal position of the wheel and roll does not exist when dressing and the table is cocked to an angle, resulting in a tapered wheel face and a dragging edge.

The Faster, the Better

It is impossible to grind a cylinder without minute flats, but the faster the work travels past any point on the wheel, the longer and hence less visible will be the flats. The faster the work speed, the better the roll surface. However, too high work speeds may cause the machine to vibrate and the roll supports to heat, damaging the surface. A high ratio of work speed to wheel speed, especially desirable in finishing cuts, may be secured by reducing the wheel speed.

The traverse per revolution of the work on all finishing cuts should be as little as possible. Since most machines do not have as slow traverse as desirable for this purpose, it is necessary to speed up the work. As a rule in all roll grinding operations, use as high a work speed as possible without causing vibration.

With a properly graded wheel, the best traverse rate for a roughing cut is from one-half to two-thirds the width of the wheel per revolution of the work. For finishing, the traverse should be not more than one-quarter of an inch per revolution of the work.

The wheel should never be allowed to travel off the work more than one-fourth the width of the face for the reduced area of contact increases the pressure per unit. of area, tending to grind the ends of the roll under-size and to cause chatter. Care should be taken to minimize dwell at the end of a pass.

Slow traverse with heavy cuts gives greater wheel efficiency than

ABRASIVE COMPANY GRINDING WHEELS

A complete service for every grinding wheel and abrasive requirement in industry—backed by modern plant facilities and more than 45 years' specialized experience.

Prompt service from local stocks in all industrial centers through leading mill supply distributors. Name of distributor nearest you sent on request.

SIMONDS FAMOUS FAMILY OF METAL CUTTING TOOLS

ABRASIVE COMPANY
Division of Simonds Saw and Steel Co.
Tacony and Fraley Sts., Philadelphia, Pa.
Chicago Branch: 1024 South Western Avenue

rapid traverse with light cuts. Do not hurry a roll grinding job. To avoid a pattern on rolled steel products, grit marks on the roll—which are unavoidable—must be extremely shallow. To achieve this, the roll surface must be built up with a series of grinding wheels to give a decreasing depth of grain penetration; that is, each successive wheel must be of finer grit than the one preceding it. Light cuts are important since the quality of the surface is limited by the amount of stock removed with a single wheel. Since smaller grit sizes tend to produce better surfaces than large grits, it is becoming common practice to use finer grits for all operations and to take finer cuts even when roughing.

All of these considerations dictate that plenty of time be taken in grinding a roll. The results warrant slow generation of surface and finish. There are no short cuts to getting satisfactory surfaces.

Even when comparatively coarse wheels are used for the rough grinding and are to be followed with wheels of progressively finer grit, each wheel should be finished out just as though no further finish grind was to be made.

Wheels should be brought to the work carefully and only when both wheel and work are in motion and coolant is flowing on the point of contact. When a wheel is brought to the work suddenly, it is apt to cause the wheel spindle to spring, thus permitting the wheel to bounce on the roll and produce intermittent burned spots. Although the burns may be invisible, they may develop into spalls or blisters after the roll has been in service only a short while.

Lubrication Important

Steel mill rolls are usually supported in the grinding machine wholly or partly on their necks. It is vitally important to keep the point of contact between the neck and the neck-rest properly lubricated. Lacking lubrication, the friction causes the roll to climb toward the wheel, which in turn causes irregularities in the surface.

Variations in friction at the necks during finishing cuts are fatal to high quality surfaces. A single drop of oil on the neck-rests will often change the nature of the surface being generated. The necks of the rolls, except where antifriction bearings are used, should be ground frequently, for necks may wear eccentrically. Thus when the roll surface is ground, the eccentric neck may cause the entire roll to be ground eccentric. A best, the eccentric rotation of the roll will force it against the wheel with varying pressures and so cause burned spots.

How To Estimate for Profit in Construction

■ *How to Estimate, for the Building Trades*, by Gilbert Townsend, J. Ralph Dalzell, James McKinney; cloth, 629 pages, 5½ x 8¼ inches; published by American Technical Society, Chicago; supplied by STEEL, Cleveland, for $4.75; in Europe by Penton Publishing Ltd., Caxton House, Westminster, London S. W. 1.

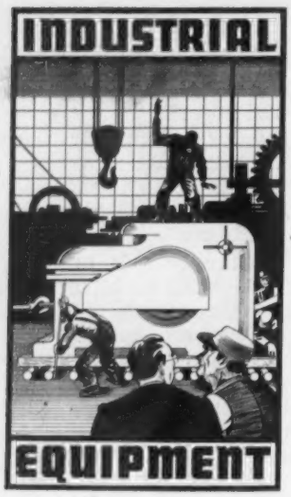
Estimating on building projects presupposes an accumulated fund of data based on previous work, to avoid mistakes that will result in loss to the contractor. This volume is based on the varied experience of the authors and analysis data acquired from a large number of others in the trades.

It covers carpentry, masonry, lath and plaster, marble and tile, air conditioning, electrical wiring, sheet metal, plumbing, linoleum, glass, painting and hardware.

Instruction in the text is built around an actual set of architect's plans for a small residence. The plans accompanying the book are full size working drawings from which the reader may take dimensions or scale them.

Question and answer method is used throughout the text, covering typical material and labor costs.

You never see RED
on the Tang—unless it's a SIMONDS FILE
And you never "see red" on the job . . . with the topnotch performance you always get from Red Tang Files. For Simonds makes only this one grade of file—the best that money can buy. Teeth are shaped like a metal saw . . . take off more metal with less elbow grease. And these teeth stay sharp longer, do not fill up or clog. For every type of filing work, there's a test-proved Red Tang File—always exactly uniform from one order to the next. USE IT . . . and get better work in shorter time, at lower cost per file.
ALWAYS ASK FOR
Simonds U.S.A.
TRADE MARK Reg. U.S. Pat. Off.
RED TANG FILES Made only by
SIMONDS SAW AND STEEL CO., Fitchburg, Mass.
ASK YOUR SUPPLY DEALER
SIMONDS
Famous Family of
METAL CUTTING TOOLS

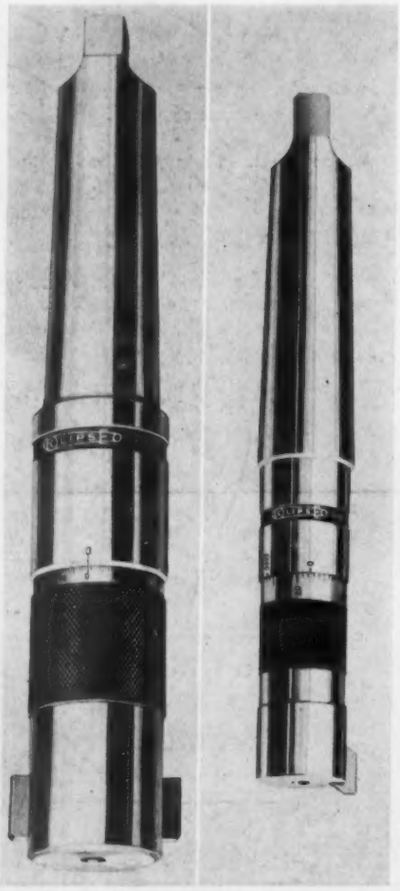


Boring and Reaming Bars Can Be Adjusted Quickly

■ Eclipse Counterbore Co., 7410 St. Aubin avenue, Detroit, has placed on the market a line of Micro-Lok boring and reaming bars, featuring maximum rigidity and cutting ability, with means for quickly adjusting blades and locking them in place.

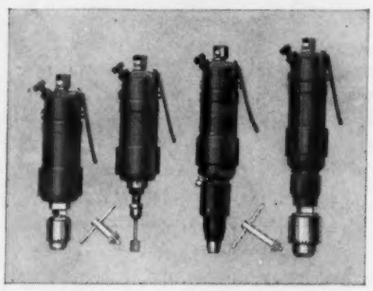
Jig boring tools, in sizes from ¾-inch to 4 inches in diameter, and highspeed precision boring tools for boring holes as small as 0.500-inch in diamond boring machines are adjustable in increments of 0.0005-inch. Two-bladed fixed type, as well as floating blade boring bars, designed for accurate hole finishing, are adjustable in increments of 0.0005-inch.

Automatic feed-out type tools for recessing and undercutting otherwise inaccessible surfaces, and bars having piloting sections both above and below the work, with two or more cutting blades in tandem or independently distributed on the bar for multiple-diameter line boring, are also made with the Micro-Lok adjustment.



Air Tools Designed for Light Fabricating Work

■ Cleveland Pneumatic Tool Co., 3734 East Seventy-eighth street, Cleveland, recently brought out a



line of portable pneumatic tools, known as Series No. 9, for drilling, grinding, screw-driving and nut-setting.

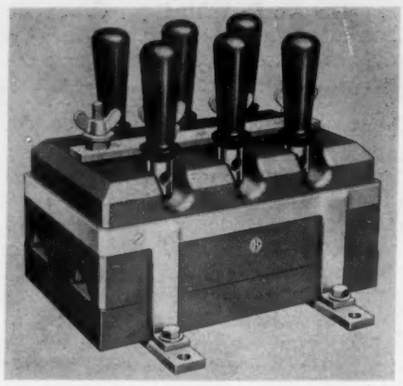
Weighing less than 2 pounds each, these small tools are designed especially for use in light fabricating operations. All styles are fitted with an air regulator in the head to control output of power.

Drill has a capacity of ⅛ to 3/16-inch in steel, and grinder will handle mounted emery wheels up to ¾-inch diameter. Nut setter is recommended for nuts up to ¼-inch bolt size, and screwdriver handles machine screws up to No. 12 size. Grinder turns at 20,000 revolutions per minute; other tools have speed of 2100 revolutions per minute.

Junction Box Connects Circuits With Power Off

■ Ohio Brass Co., Mansfield, O., has placed on the market a cable connection device, known as the Type A multiple junction box. Simple in design and operation, this box facilitates connection of one to three circuits with power off. It is designed especially for handling trailing cable connections for cutting, drilling and loading machines at the face.

Body of the junction box is impregnated wood, with feeder cable inlet and outlet at one end. Cable ends are accommodated by adjustable clamps within body of the box. A combination galvanized malleable iron clamping band and mounting arrangement locks the two sections of the box together after connection of feeder cable.

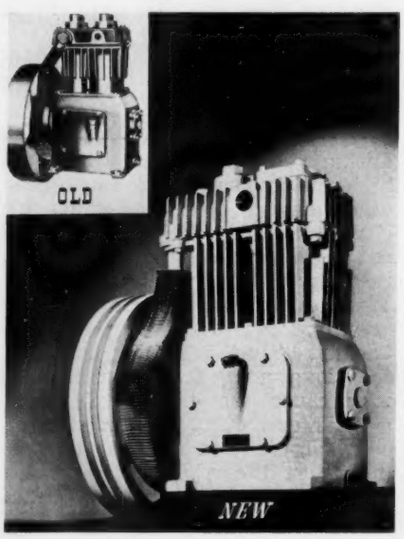


Trailing cables from machines are inserted into rubber handled phosphor-bronze plugs and locked tightly into position by a turn of the rubber handle. When connection is desired the plug body, split for a tight wedge fit, is inserted into its proper hole in the junction box. Unit is for 250 to 600 volts, direct current.

Compressors Modernized In Design and Operation

■ Quincy Compressor Co., Quincy, Ill., has announced nine improved air compressors, characterized by modern design. They are more compact and business-like in appearance, and are improved also in operating efficiency, according to the makers.

Construction of these compressors has been simplified. There is a 12



Have You Seen This HELPFUL LITERATURE?

Here are the latest industrial publications reviewed for your benefit. They are yours for the asking. There is no charge or obligation. Simply fill in the convenient coupon and return.

(1)—Roller Bearings

Bower Roller Bearing Co. — 192-page, loose leaf engineering data book. Technical data, drawings and other essential information relating to mechanical design, processing, application and functioning of Bower roller bearings are given. Complete list of Ahlberg Bearing Company's branches (exclusive distributors) is included.

(2)—Platform Trucks

The Elwell-Parker Electric Co.—Illustrated bulletins on low lift (No. A-8416) and high lift (No. A-8459) platform trucks. Both trucks have rated capacity of 10,000 lbs. and are equipped with Elwell-Parker k-75 controller allowing four speeds forward and four reverse and dynamic brakes. Other attachments are also shown.

(3)—Metal Hose

Chicago Metal Hose Corp.—38-page illustrated catalog No. G-14. "Rex-Weld" and "Rex-Tube" flexible metal hose for steam, fluids, chemicals and other uses is fully described. Typical applications are shown. Diesel exhaust hose, stainless steel bellows and "Vibra-Sorbers" are also covered.

(4)—Cotton Bags

Ames Bag Machine Co.—6-page illustrated folder. "Short Cuts in Shipping" tells how many shipping worries can be eliminated. Reduction in shipping costs, and reduction of complaints due to lost parts are features of the new packing methods described.

(5)—Hoists and Cranes

Robbins & Myers, Inc.—Illustrated loose leaf type catalog. Electric cranes, hoists and winches for light and heavy duty are fully described and illustrated. Full specifications and dimensional information, together with typical shop views are included.

(6)—Bearings

Moraine Products Div., General Motors Corp.—40-page multi-color illustrated plastic bound handbook of "Durex" bearings. Structure, properties, load carrying ability and full information on applications and installation of these oil-absorbing special bronze bearings are given. A microphotograph and "Macyscope" for viewing it, are supplied.

(7)—Materials Handling

Stephens-Adamson Mfg. Co.—36-page illustrated catalog No. 4238. "Redler" conveyors and elevators for handling practically all types of materials in any kind of plant set-up, are fully described. Actual installations and many theoretical set-ups are shown. Specifications and a list of users are given.

(8)—Fence Fittings

Superior Fence & Gate Co.—6-page illustrated loose leaf type booklet and price list. "Superior" chain link fence fittings are said to reduce installation costs. Quick delivery is possible because of the large stock available and centrally located warehouses.

(9)—Nails

Republic Steel Corp.—52-page illustrated spiral bound catalog No. WD-207. Shows size, length, gage number, diameter of head, approximate number per pound and description of 62 types of nails. Standard extras per 100 lbs. are given. The history of nails is illustrated and described. Other wire products are covered briefly.

(10)—Connectors

Delta-Star Electric Co.—168-page illustrated bulletin No. 38-D. Bus and cable connectors and clamp and solder type conductor fittings for all types of electrical work are fully described and illustrated. Technical descriptions and specifications are given. Indexed for easy reference.

(11)—Lubricant

New York & New Jersey Lubricant Co.—4-page illustrated bulletin No. 32. Lubrication of gears and bearings on motor trucks and buses is discussed and recommendations for use of "Non-Fluid Oil" to reduce wear and maintenance costs are given. Testing samples are offered.

(12)—Chaser Grinders

Landis Machine Co.—8-page illustrated bulletin No. A-87-1. Chaser grinders and chaser grinder fixtures for grinding Landis tangential chasers to correct lead and rake angles are fully described. Specifications are given.

STEEL
Readers' Service Dept.
1213 West Third St.,
Cleveland, Ohio

FFL
2-13-39

Send me the literature I have circled below.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29			

Name_____

Company_____ Title_____

Address_____

City_____ State_____

This card must be completely filled out.

FIRST CLASS
PERMIT No. 36
(Sec. 510 P.L. & R.)
Cleveland, Ohio

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

2c POSTAGE WILL BE PAID BY—

STEEL
Penton Building
CLEVELAND, OHIO

Readers' Service Dept.

HELPFUL LITERATURE

(13)—Stamping Machine

Chambersburg Engineering Co.—13-page illustrated bulletin No. 275A. The "Ceco-stamp" stamping machine forms stainless steel, low-ductility alloys, thin hot work that cools quickly and is used for embossing and small-quantity production. Full information on the machine and illustrations of typical work produced is included.

(14)—Gas Appliances

American Gas Furnace Co.—28-page illustrated booklet on small appliances. Blowpipes, fish tail burners, muffle furnaces, forges, furnace tables, melters, soldering iron heaters, rivet heaters, tool room furnaces, high speed furnaces, oil tempering furnaces, pyrometers and blowers are described and illustrated.

(15)—Sheet Steel

The American Rolling Mill Co.—32-page illustrated spiral bound booklet No. P. O. 16. Armco electrical sheet steel, its manufacture, characteristics and uses is fully described. Available grades, core loss guarantees and general specifications, together with numerous curves showing characteristics are given.

(16)—Instruments

The Brown Instrument Co.—8-page illustrated folder No. G-37. Complete line of indicating, recording and controlling instruments for measuring and controlling temperatures, pressures, flows, liquid levels and humidity is described. Typical installations are shown.

(17)—Speed Selector

Gisholt Machine Co.—6-page illustrated folder Form No. 1074. The new speed selector simplifies the operators job in selecting the correct speed of lathes for various work, eliminating inefficient speeds and unnecessarily dulled tools. Increases production and eliminates lost time.

(18)—Screw Drivers & Bits

The Apex Machine and Tool Co.—40-page illustrated loose leaf type catalog of Apex-Phillips and regular type screw drivers and bits. Dimensional drawings and photographs of various styles for electric, air, spiral and hand driven drivers are shown. A price list completes the catalog.

(19)—Hack Saw Blades

Simonds Saw and Steel Co.—24-page illustrated booklet "Hacksaw-ology". Various types of hack saw blades are illustrated and described. Suggestions for proper operation and care of blades used in either machine or hand operations are included.

(20)—Quill Bearings

Bantam Bearings Corp.—4-page illustrated bulletin No. 103. Provides full information on construction, specifications and prices of quill roller bearings. Small space requirements, high load carrying capacity and economy are claims for this type of bearing.

(21)—Aluminum Flux

Pennsylvania Salt Manufacturing Co.—8-page illustrated folder No. 1. "Kryolith" is useful in making metallic aluminum and as a flux and electrolyte for aluminum oxide in electric furnaces. Its uses, advantages and characteristics are fully described.

(22)—Milling Machines

The Cincinnati Milling Machine Co.—6-page illustrated folder No. M-814. New Nos. 2-18 and 2-24 plain automatic milling machines are presented and fully described. Operating and construction features and complete specifications are given.

(23)—Materials Handling

Chain Belt Co.—16-page illustrated bulletin No. 331. "How to Handle It With Rex Coal and Ash Handling Equipment" shows typical installations, and completely describes various types of materials handling equipment.

(24)—Production Equipment

Allis-Chalmers Manufacturing Co.—96-page illustrated loose leaf type bulletin No. 161. Shows and describes latest developments in production equipment for the mineral and related industries. Also includes information on blowers and compressors, electrical, power, pumping, transmission and related equipment. Fully indexed

(25)—Conveyor

Johns Conveyor Div., The Osborn Manufacturing Co.—8-page illustrated booklet No. J-1-11. The Johns Conveyor, described as "the pipeline that moves", is designed to handle granular materials and liquids. Flexibility is said to be an outstanding feature. Typical applications and full description are given.

(26)—Babbitt Metal

Joseph T. Ryerson & Son, Inc.—8-page illustrated bulletin on "Glyco" babbitt. Explains physical structure, with resulting homogeneity and uniformity of quality. Recommended applications for various grades carried in stock are given.

(27)—Valves

The Foxboro Co.—28-page illustrated bulletin No. 214-1. Quick-opening and "Stabilflo" types of air-operated controlled valves are described with specifications, diagrams, cutaway photos and by operation power curves. Engineering data is included.

(28)—Electric Cable

Anaconda Wire and Cable Co.—4-page illustrated bulletin on "Sunex Securityflex" U. S. Bureau of Mines approved electric cable. Suitable for voltages from 300 to 7000, and available in shielded and unshielded, single and multiple types.

(29)—Cylinders

Hanna Engineering Works—28-page illustrated catalog No. 228. Complete specifications and details of cushioned and non-cushioned air cylinders and hydraulic cylinders are given. "Unitite" valves and foot operated valves are also described.

STEEL
Readers' Service Dept.
1213 West Third St.,
Cleveland, Ohio

FFR
2-13-39

Send me the literature I have circled below.

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
17	18	19	20	21	22	23	24	25	26	27	28	29			

Name_____

Company_____ Title_____

Address_____

City_____ State_____

This card must be completely filled out.

FIRST CLASS
PERMIT No. 36
(Sec. 510 P.L. & R.)
Cleveland, Ohio

BUSINESS REPLY CARD
No Postage Stamp Necessary if Mailed in the United States

2c POSTAGE WILL BE PAID BY—

STEEL
Penton Building
CLEVELAND, OHIO

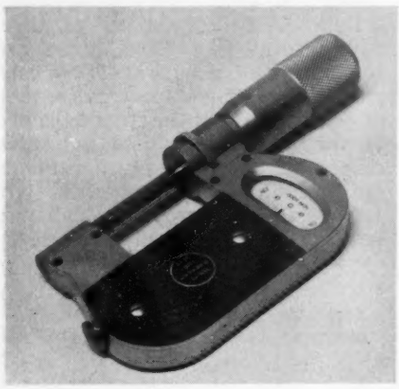
Readers' Service Dept.

per cent greater radiation area on cylinders; a more thorough constant level oiling system; totally enclosed, dustproof crank cases; and non-breakable, cushioned discharge valves. When furnished for automatic start and stop operation, these compressors are equipped with a loadless starting device which automatically withholds all load from the motor until it reaches full speed.

Sizes range from 2.8 to 30.1 cubic feet per minute piston displacement. Single stage—single cylinder, single stage—duplex cylinders and two stage models are available in a wide variety of standard and special mountings.

Indicating Micrometer Has Sturdy Mechanism

■ George Scherr Co., 128 Lafayette street, New York, has devised an indicating micrometer and comparator in which all gears and



racks are eliminated from the indicator mechanism. Instead a knife-edge, lever type mechanism is used.

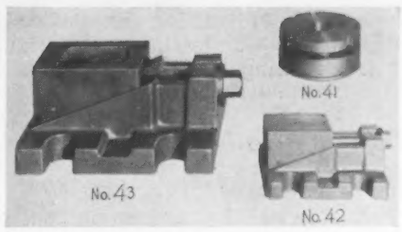
This revision is said to eliminate uncertainty of measuring feel, since it includes a feature which makes the measuring pressure visible. There is an anvil relieving button which moves back the lower anvil for inserting and removing work. When work is inserted and the button released, the anvil is pressed against the work by a light pressure return spring. Thus, no matter who does the measuring, the reading is the same.

Micrometer is constructed to withstand constant service. It measures in ten-thousandths of an inch.

Jacks Designed to Level And Align Machine Tools

■ Baker Bros. Inc., Toledo, O., has announced three new jacks, covering alignment and leveling requirements for certain types and sizes of machine tools.

No. 41 jack is designed for use with lathes, milling machines and

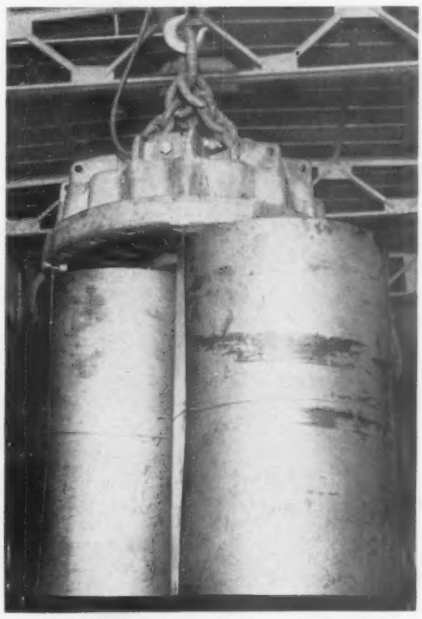


similar equipment. It is 4 inches in diameter, 2¼ inches high and has a screw type adjustment with 1⅝ inches maximum range. No. 42 is for small planers and boring mills. It measures 5¾ x 5 x 3 inches and has adjustment range of 2¾ to 3¼ inches by means of an angle slide adjustment screw. No. 43 jack is intended for use with large planers, boring mills, etc., and is the same type as No. 42. It measures 9 x 8 x 4¾ inches and has angle slide adjustment range of 4¼ to 5 inches.

Redesigned Magnets Lift Seven Times Own Weight

■ Dings Magnetic Separator Co., 709 Smith street, Milwaukee, has redesigned and broadened its lifting magnet line to a point where it includes sizes from 18 to 65 inches, with lifting capacities up to 65,000 pounds. These magnets will lift up to seven times their own weight, and find application in handling slabs, castings, skull cracker balls, scrap, borings, turnings, coils of strip steel, etc.

Magnet bodies are cast from soft dynamo steel, and the structural fins are designed for increased strength and greater radiating surface. Center pole is annealed chromium steel and is attached to magnet by nickel

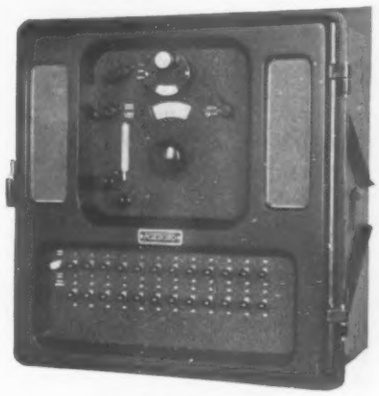


steel bolts. Outer pole is also chromium steel. Coil is designed to give maximum magnetic pull and is completely encased in a waterproof enclosure.

Instrument Centralizes Temperature Indication

■ Foxboro Co., Foxboro, Mass., has developed a key-switch cabinet indicating potentiometer to provide centralized temperature indicating for numerous and scattered points in industrial plants. As many as 82 switches may be located on the key-switch panel.

Switch identification panels are arranged beside the indicating panel containing the scale and vernier dial-knob. Instrument case is universal type, suitable for surface mounting on a wall or for flush mounting through the instrument board. All connections are made



from front of the board, and pressed steel case is provided with 10 knock-out openings.

A unique vernier-type rheostat makes standardizing easy and exact. Instrument can be used with either single or double range for one or two types of thermocouples, and with scales calibrated in degrees Fahr., degrees Cent. or in millivolts. Temperature readings can be made down to 1 degree on a 1000-degree Fahr. scale. Accuracy is guaranteed to be within ¼ of 1 per cent of the full scale.

Announces Contactor for Spot and Flash Welding

■ General Electric Co., Schenectady, N. Y., has announced a new ignitron contactor for highspeed spot and flash welding applications such as automobile body fabrication.

Contactor is said to provide quiet operation, even when rapidly interrupting hundreds of amperes. It

(*Please turn to Page* 82)

Coil Conveyors

(*Concluded from Page* 70)

scribed above are capable of handling coils with a maximum outside diameter of 54 inches and a maximum width of 77 inches, ranging in weight up to as much as 12,000 or 14,000 pounds.

A considerable percentage of the wide strip produced at Irvin is pickled and cold reduced. When the coils are not sent through the side trimming and recoiling line, they are taken from the cold reduction mills by ram type tractors to another ingenious tilter, shown in Fig. 4. This unit upends the coils so they can be handled easily by the crane magnet and transferred to special cars for delivery to the annealing department.

Rollers Mounted on Springs

The tilter shown in Fig. 4 has several new features of interest. All rollers on the flat section are mounted on springs, as may be seen at the end of this section of the tilter in Fig. 5. These rollers are chain driven through sprockets mounted on the ends of the rolls. When the coil is in position on this section of the tilter, the motor driving the rollers is started, advancing the coils on end to another similarly equipped conveyor section from which they are taken by the magnet crane.

This tilter unit serves a double purpose, positioning coils for delivery to the annealing department, or taking annealed coils and positioning them for ram truck delivery to the temper pass mills. The individual springing of the rolls is of special value in handling annealed coils, practically eliminating coil marking in the tilting operation.

•

Continuous Ternes

(*Concluded from Page* 50)

coating machine and equipment of unusual design are many times as long as used for coating ordinary terne sheets.

From here, the inspected and accepted prime coils are taken to the stamping press where the brand, grade, weight and patent license are embossed on the coil at about 6-foot intervals. There are several points in the production line where the rolls could have been stamped automatically, eliminating an operation, but no coil is stamped or trade-marked until it has been thoroughly inspected and pronounced a perfect prime. Every coil of roofing shipped is a prime, stamped with the grade, weight of coating and license stamp covering equipment and process patents.

Rolls pass from stamping press to the paint machine, are painted one or two sides and are again coiled, banded and crated for shipment. The Follansbee organization has improved shipping containers and loading methods for seamless rolls so they may reach the customer in the best possible condition. Raw materials, semifinished stock and finished product are checked for quality and control by practical, experienced operators, chemists and metallurgists.

The only maintenance required on a good terne roof in the past, other than occasional painting, has been the re-soldering of cross seams. This has been entirely eliminated by the use of the continuous seamless roll. Also the absence of multi-thickness cross seams makes the seamless roll much easier to apply and to paint. Its uniform width and straightness eliminate the need of field trimming to correct for camber—all making for a better roof at a lower application cost.

Treatment for Corrosion Prevention Is Described

■ Recently published by the bureau of standards, Washington, is a paper describing methods used in a current investigation of surface treatments for corrosion protection of steel for low-cost housing construction.

Some factors affecting protective value of paints for steel and galvanized surfaces were studied by accelerated laboratory tests, supplemented by outdoor exposure tests. Brief descriptions of these tests are given. Significance and limitations of experiments as compared without actual service tests are discussed, and the materials, pretreatment processes and paints included in the testing program are outlined. Special attention is given to severity of corrosion which may result from condensed moisture.

This paper, designated as Report BMS8, may be obtained from the bureau at ten cents a copy.

Exhaust Ventilation Secrets Made Plain

■ *Design of Industrial Exhaust Systems,* by John L. Alden; cloth, 220 pages, 5½ x 8½ inches; published by Industrial Press, New York; supplied by STEEL, Cleveland, for $3; in Europe by Penton Publishing Co. Ltd., Caxton House, Westminster, London, S.W.1.

The purpose of this book is to tell the engineer how to design and build or how to buy an exhaust system that will perform functions prescribed by the industrial hygiene expert or by law. Although exhaust ventilation has been practiced for more than 70 years and has been recognized by statute for more than 40 years its literature is scanty.

The author seeks to dispel most of the mystery surrounding exhaust work and to express many of the trade secrets in straightforward engineering terms.

The volume covers flow of fluids, hood forms, air flow through hoods, pipe resistance, piping design, dust separators, low-pressure conveyors, centrifugal exhaust fans, structural details and system planning and field measurements and their interpretation.

"HERCULES" RED-STRAND REG. U.S. PAT. OFF.
WIRE ROPE

Furnished in Flattened Strand, Round Strand, Preformed, Steel Clad and Non-Rotating constructions.

A GIANT in Strength and Endurance

MADE ONLY BY
A. Leschen & Sons Rope Co.
ESTABLISHED 1857
5909 KENNERLY AVENUE
ST. LOUIS, MO.

NEW YORK
CHICAGO
DENVER
SAN FRANCISCO
PORTLAND
SEATTLE

Welded Locomotives

(*Concluded from Page 66*)

synthetic loads and measuring the resultant stresses and deflections in important members of the body. For such work, all surfaces of structure are shot blasted. Loads are applied in various locations of the structure similating those of actual operating conditions. These loads are produced by manually operated loading jacks, previously calibrated in a compression testing machine. As many as 16 of these jacks may be used in conjunction with one series of tests.

Loading is conducted on actual or 100 per cent pressures, followed by 125, 150 and 175 per cent of actual working loads, after which all welds are carefully examined. So far, not a single defective weld has been discovered, thus proving the accuracy of calculations as well as reliability of workmanship.

Develops Procedure For Spot Welding Heavy Work

■ At the Erie, Pa., works of General Electric Co., some interesting work is being done in spot welding commutating pole assemblies. Here a plate, varying from 3/16 to ⅜-inch in thickness and forming the tip or end of the pole, is spot welded to the pole body which varies from 2 to 6 inches in height.

In fact, some work has been done in spot welding ½-inch plate to 3-inch and 6-inch plate. Heretofore, such work has been accompanied by extreme difficulties that made spot welding in these thicknesses quite impractical. It is evident that the commercial limits of spot welding have not as yet been plumbed and that further developments will be forthcoming.

•

Handbook on Foundry Work in New Edition

■ *Foundry Work*, by William C. Stimpson and Burton L. Gray; revised by John Grennan; cloth; 216 pages 5 x 8 inches; published by American Technical society, Chicago; supplied through STEEL, for $2; in Europe by Penton Publishing Co., Caxton House, Westminster, London, S. W. 1.

This volume, one of an extensive series of handbooks, is designed as a practical handbook on standard foundry practice, including hand and machine molding, casting operations, melting and pouring equipment, metallurgy of metals and related features. Cognizance is taken of the fact that casting methods have partaken of general mechanical development in recent years. While the basic principles of casting manufacture have not changed, all the newer developments are presented.

Discussion on molding practice is illustrated by a number of typical problems and by descriptions of the many types of molding machines. Subjects covered in greater or lesser detail include: Molding practice, molding equipment, molding processes, typical molding problems, molding machines, pattern mounts, open sand molding, loam molding, coremaking, casting operations, foundry materials, sand and refractories, fuels, sand handling and conditioning equipment, continuous pouring, melting equipment, metal handling equipment, handling and cleaning castings, copper alloys, aluminum alloys, magnesium alloys, bearing alloys, zinc base casting metals, testing cast metals, classification and specifications for gray iron castings, steel casting specifications, alloy cast steel specifications, mixing metals, heat treatment.

Of the authors, Mr. Stimpson formerly was head instructor in foundry work and forging, Pratt institute, Brooklyn, N. Y.; Mr. Gray is instructor in foundry practice, Worcester Polytechnic institute, Worcester, Mass.; and Mr. Grennan is instructor in shop practice, University of Michigan, Ann Arbor, Mich.

YOU'LL SAVE ON WELDING COSTS
USING MUREX FOR SUCH JOBS
The cost of electrodes used is a very minor part of the cost of any welded structure. But, the choice of electrodes can be a major factor.
When Murex Electrodes go on the job, welding costs go down because their ease of handling and speed of operation save time and increase production.
Ask to have the Murex representative in your territory call and show you the outstanding features of these cost-cutting electrodes. At the same time, make use of his experience in shop practice, production methods, and welding procedure. Let him help solve your welding problems. No obligation is involved.
Write, also, for the pocket-size Murex pamphlet giving applications, physical properties, etc., for each electrode in the Murex line.
1 You can make real savings with Murex in fabricating heavy work such as this 90,000 lb. press crown. Users report 10% to 30% less welding time on fillets and downhand work. Photo courtesy Taylor-Winfield Corp., Detroit, Mich.
2 No need to worry about strength, soundness or ductility of Murex welds. Murex provides electrodes to meet every possible requirement along these lines. Photo of Murex-welded shovel courtesy The Osgood Company, Marion, O.
3 In making welded gears—a mass production operation—Murex steps up work; assures clean, good looking welds. Photo courtesy Shaw Box Crane & Hoist Company, Muskegon, Mich.
4 For welds subject to high pressures and temperatures, two separate Murex rods assure rapid deposition of just the right type of weld metal. Photo courtesy Columbian Steel Tank Co., Kansas City, Mo.
5 Used at higher amperages, Murex Electrodes speed welding and keep down costs—important in rush work, even more than on regular schedules. Photo of welded snow plow courtesy Carl H. Print, Mfr., Cleyton, N. Y.
MUREX
HEAVY COATED
ELECTRODES
METAL & THERMIT CORPORATION
120 Broadway, New York, N. Y.
Albany • Chicago • Pittsburgh • So. San Francisco • Toronto

Industrial Equipment

(*Continued from Page 79*)

has no moving parts, and ignitron tubes can be replaced quickly. Device consists of two water-cooled, sealed-off tubes mounted on a composition panel with the control circuit. Tubes are so connected as to conduct full-wave alternating current to the welding machine when control switch is closed. Any type timer can be used to control this contactor. Device is available in the following ratings, based on typical welding duty cycles: 150, 300, 900 and 2500 amperes.

Cellulose Face Shield Permits Clear Vision

■ Willson Products Inc., Reading, Pa., has announced a new Protecto-Shield for guarding the faces of

workmen in light grinding, woodworking, spot welding and similar operations.

This lightweight shield permits clear vision in all directions. It is made of thick, transparent cellulose acetate, is well ventilated and large enough to fit over spectacles. It extends well back along sides of the face, and is easily thrown back when not in use. A special knitted sweat pad adds to the wearer's comfort. Shield may be obtained in clear, amber or green transparent cellulose.

Torque Motor-Operated Brake Has Large Lining

■ Cutler-Hammer Inc., 315 North Twelfth street, Milwaukee, has placed on the market a torque motor-operated brake for alternating current service on elevators, cranes, hoists and similar installations, where positive, cushioned braking

is required for stopping or holding a load.

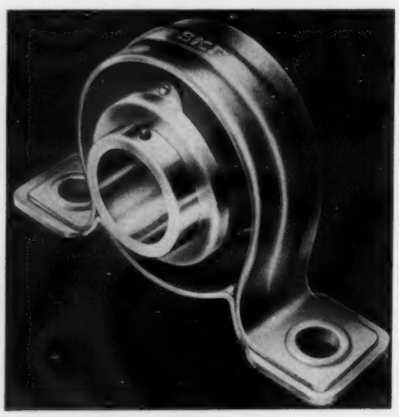
Operating through a simple anti-friction ball jack, a sturdy torque motor releases the brake. When brake is fully released, torque motor is stalled across the line. When circuit is opened, the heavy, helical torque spring sets the brake. A slight flywheel action of the rotor provides smooth braking.

Brake is available in five sizes, providing maximum torque ratings of 160, 400, 800, 1600 and 3200 pounds per foot on intermittent duty. Advantages claimed for this brake are: Smooth, quiet operation; large lining area; individual shoe adjustment; adjustable torque; hardened manganese nickel wheel; hardened steel pins and bushings.

Pillow Block Insulated Against Noisy Operation

■ SKF Industries Inc., Front street and Erie avenue, Philadelphia, has introduced recently the Rubber-Flex pillow block, comprising a self-locking bearing of the Grip-Lock type.

Bearing is inherently aligning, thus compensating for inaccuracies of setup and conditions of shaft misalignment. It is encased in a pressed steel housing equipped with felt seals to exclude dirt. Bearing and



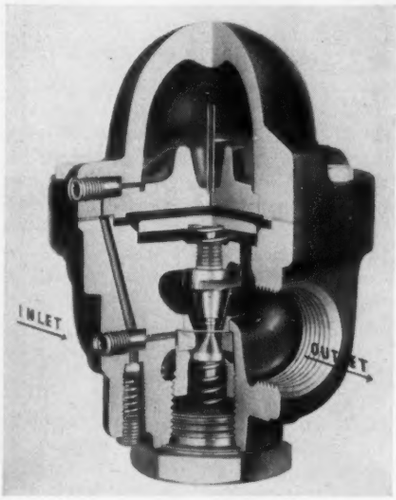
housing are surrounded with an elastic material having special sound-absorbing qualities and treated to make it impervious to oil and grease.

This unit has wide application in fields requiring anti-friction bearings with unusually quiet operating characteristics. Blocks are available in ¾ and 1-inch shaft sizes.

Regulator Controls Air, Gas or Steam Pressures

■ Grove Regulator Co., Oakland, Calif., has developed a forged steel pressure regulator, manufactured in rated capacities up to 6000 pounds per square inch for gas and air and up to 1500 pounds S.W.P. at 950 degrees Fahr. for steam.

Within the dome air pressure is permanently sealed for the purpose of valve motivation. A unique use



of Boyle's law of enclosed gases avoids necessity of spring or counterweight loading of the diaphragm. It is claimed this principle develops smoother outlet pressures with greater control sensitivity. Valve chatter and erratic valve overmovements are said to be avoided. Being single-seated, valve automatically shuts off in the event of a diaphragm rupture.

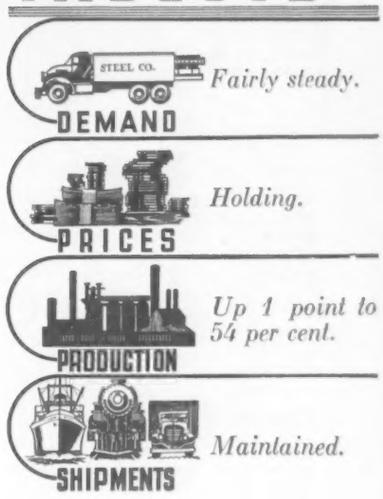
Adds New Relay Cases

■ Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has brought out a new line of standard rectangular relay cases, which provide similarity of appearance and standard wiring and mounting arrangement for the most commonly used relays. Relays in the standard cases have the same electrical and time characteristics as the former design. Previous types of cases will be supplied where they are required for replacement and matching purposes.

Steel Production, Demand Sustained

Orders Vary Little; Rails, Tin Plate More Active

MARKET IN TABLOID ★



■ STEEL demand is barely holding its own. Some fairly large rail orders have been placed, but these have partly been offset by a letdown in structural and concrete reinforcing bar bookings. Tin plate business is quickening, while variations in demand elsewhere are slight.

Reflecting only small change in the volume of new business, ingot production is moving within a narrow range. Last week the national rate was up 1 point to 54 per cent, a new high for 1939 and comparing with 31 per cent a year ago. In the corresponding 1937 week the average was 81 per cent and three years ago it was 53.

The automotive industry continues outstanding among leading consumers, but steel orders remain at the slower rate that has prevailed since last quarter when forward needs were covered extensively.

Motorcar assemblies last week rebounded from 79,410 units to 84,500 and recovered about one-half the loss of the previous week, when adverse weather hampered operations of some interests. With Ford output steady at 21,750 units, General Motors last week stepped up from 33,865 to 34,065, Chrysler from 15,820 to 20,645 and all others from 7975 to 8040. Production for the industry is more than 45 per cent larger than a year ago.

More Rails Bought; Carriers Still Limiting Expenditures

Railroad steel buying is headed by orders for about 80,000 tons of rails. Union Pacific railroad has indicated it will start work within 60 days at its own shops to build 2000 steel box cars. A few other roads have car inquiries pending, but railroad budgets in general point to only relatively moderate capital expenditures this year. Nevertheless, a fairly large gain over the depressed 1938 requirements appears assured.

Shipments of building steel continue active, despite the fact new inquiries for major construction projects have moderated considerably since last quarter, when a large number of public works jobs were appearing for bids. Residential building has increased in some districts, and manufacturers of certain types of household equipment are stepping up operations, with an accompanying influence on steel releases. The better outlook for domestic appliance output compared with 1938 is predicated on the smaller carryover of finished units this year and the prospect for an upturn in residential building.

Indicative of the varying trend on occasions in steel ingot production and finished steel shipments, January deliveries of the latter by United States Steel Corp. were the largest since October, 1937 and 16.2 per cent ahead of last November. On the other hand, January ingot output by the entire industry, while slightly larger than in December, was off 10.8 per cent from November, peak month of 1938 in this respect.

Tin Plate Output Advances; Additional Gains In Sight

Tin plate production is up to 50 per cent, although buying for manufacture of food packing cans has yet to broaden materially. In view of this circumstance further improvement in operations is expected.

Mixed tendencies prevailed last week in ingot production at individual plants and districts. In most areas output was unchanged or higher. Chicago was up 2.5 points to 51 per cent, eastern Pennsylvania rose 2 points to 36, Youngstown gained 2 points to 44. Detroit also increased 2 points to 94, while St. Louis was up 1.5 points to 50.

Activity declined at two centers, Cleveland being down 7.5 points to 56.5 per cent, with Buffalo off 2.5 points to 37. Unchanged districts included Pittsburgh at 46, Wheeling at 64, Birmingham at 80, Cincinnati at 55 and New England at 70.

Finished steel prices are holding well. The industry's earnings moved slightly further into the black last quarter, but the small margin imposed by high costs lends considerable incentive to resist price concessions.

Scrap is marking time, with prices showing little change in the face of quiet domestic demand. An adjustment at Pittsburgh raises the scrap composite 4 cents to $14.79. The finished steel composite is unchanged at $56.50.

COMPOSITE MARKET AVERAGES

	Feb. 11	Feb. 4	Jan. 28	One Month Ago Jan., 1939	Three Months Ago Nov., 1938	One Year Ago Feb., 1938	Five Years Ago Feb., 1934
Iron and Steel	$36.36	$36.35	$36.35	$36.36	$36.39	$38.90	$31.30
Finished Steel	56.50	56.50	56.50	56.50	56.68	61.70	51.10
Steelworks Scrap..	14.79	14.75	14.71	14.77	14.58	13.54	11.72

Iron and Steel Composite:—Pig iron, scrap, billets, sheet bars, wire rods, tin plate, wire, sheets, plates, shapes, bars, black pipe, rails, alloy steel, hot strip, and cast iron pipe at representative centers. Finished Steel Composite:—Plates, shapes, bars, hot strip, nails, tin plate, pipe. Steelworks Scrap Composite:—Heavy melting steel and compressed sheets.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Feb. 11, 1939	Jan. 1939	Nov. 1938	Feb. 1938
Steel bars, Pittsburgh	2.25c	2.25c	2.25c	2.45c
Steel bars, Chicago	2.25	2.25	2.25	2.50
Steel bars, Philadelphia	2.57	2.57	2.57	2.75
Iron bars, Terre Haute, Ind.	2.15	2.15	2.15	2.35
Shapes, Pittsburgh	2.10	2.10	2.10	2.25
Shapes, Philadelphia	2.215	2.215	2.215	2.465
Shapes, Chicago	2.10	2.10	2.10	2.30
Plates, Pittsburgh	2.10	2.10	2.10	2.25
Plates, Philadelphia	2.15	2.15	2.15	2.445
Plates, Chicago	2.10	2.10	2.10	2.30
Sheets, hot-rolled, Pittsburgh	2.15	2.15	2.15	2.40
Sheets, cold-rolled, Pittsburgh	3.20	3.20	3.20	3.45
Sheets, No. 24, galv., Pittsburgh	3.50	3.50	3.50	3.80
Sheets, hot-rolled, Gary	2.15	2.15	2.15	2.50
Sheets, cold-rolled, Gary	3.20	3.20	3.20	3.25
Sheets, No. 24, galv., Gary	3.50	3.50	3.50	3.90
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.90
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.10	$5.35
Wire nails, Pittsburgh	2.45	2.45	2.45	2.75

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$37.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	37.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	37.00
Wire rods, No. 5 to $\frac{9}{32}$-inch, Pitts.	43.00	43.00	43.00	47.00

Pig Iron

	Feb. 11, 1939	Jan. 1939	Nov. 1938	Feb. 1938
Bessemer, del. Pittsburgh	$22.34	$22.34	$22.34	$25.26
Basic, Valley	20.50	20.50	20.50	23.50
Basic, eastern, del. Philadelphia	22.34	22.34	22.34	25.34
No. 2 foundry, Pittsburgh	22.21	22.21	22.21	25.21
No. 2 foundry, Chicago	21.00	21.00	21.00	24.00
Southern No. 2, Birmingham	17.38	17.38	17.38	20.38
Southern No. 2, del. Cincinnati	20.89	20.89	20.89	23.89
No. 2X, del. Phila. (differ. av.)	23.215	23.215	23.215	26.215
Malleable, Valley	21.00	21.00	21.00	24.00
Malleable, Chicago	21.00	21.00	21.00	24.00
Lake Sup., charcoal, del. Chicago	28.34	28.34	28.34	30.24
Gray forge, del. Pittsburgh	21.17	21.17	21.17	24.17
Ferromanganese, del. Pittsburgh	85.27	90.25	97.77	107.49

Scrap

Heavy melting steel, Pittsburgh	$15.75	$15.60	$15.15	$14.15
Heavy melt. steel, No. 2, E. Pa.	13.25	13.25	12.75	13.25
Heavy melting steel, Chicago	13.75	13.75	13.85	12.15
Rails for rolling, Chicago	17.25	17.75	17.75	15.25
Railroad steel specialties, Chicago	15.75	16.00	16.05	14.85

Coke

Connellsville, furnace, ovens	$ 3.75	$3.75	$3.75	$4.25
Connellsville, foundry, ovens	5.00	5.00	5.00	5.25
Chicago, by-product fdry., del.	10.50	10.50	10.50	11.00

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Except when otherwise designated, prices are base, f.o.b. cars.

Sheet Steel

Hot Rolled

Pittsburgh	2.15c
Chicago, Gary	2.15c
Cleveland	2.15c
Detroit, del.	2.25c
Buffalo	2.15c
Sparrows Point, Md.	2.15c
New York, del.	2.39c
Philadelphia, del.	2.32c
Granite City, Ill.	2.25c
Middletown, O.	2.15c
Youngstown, O.	2.15c
Birmingham	2.15c
Pacific Coast points	2.65c

Cold Rolled

Pittsburgh	3.20c
Chicago, Gary	3.20c
Buffalo	3.20c
Cleveland	3.20c
Detroit, delivered	3.30c
Philadelphia, del.	3.52c
New York, del.	3.54c
Granite City, Ill.	3.30c
Middletown, O.	3.20c
Youngstown, O.	3.20c
Pacific Coast points	3.80c

Galvanized No. 24

Pittsburgh	3.50c
Chicago, Gary	3.50c
Buffalo	3.50c
Sparrows Point, Md.	3.50c
Philadelphia, del.	3.67c
New York, delivered	3.74c
Birmingham	3.50c
Granite City, Ill.	3.60c
Middletown, O.	3.50c
Youngstown, O.	3.50c
Pacific Coast points	4.00c

Black Plate, No. 29 and Lighter

Pittsburgh	3.05c
Chicago, Gary	3.05c
Granite City, Ill.	3.15c

Long Ternes No. 24 Unassorted

Pittsburgh, Gary	3.95c
Pacific Coast	4.65c

Enameling Sheets

	No. 10	No. 20
Pittsburgh	2.75c	3.35c
Chicago, Gary	2.75c	3.35c
Granite City, Ill.	2.85c	3.45c
Youngstown, O.	2.75c	3.35c
Cleveland	2.75c	3.35c
Middletown, O.	2.75c	3.35c
Pacific Coast	3.35c	3.95c

Corrosion and Heat-Resistant Alloys

Pittsburgh base, cents per lb.

Chrome-Nickel

	No. 302	No. 304
Bars	24.00	25.00
Plates	27.00	29.00
Sheets	34.00	36.00
Hot strip	21.50	23.50
Cold strip	28.00	30.00

Straight Chromes

	No. 410	No. 430	No. 442	No. 446
Bars	18.50	19.00	22.50	27.50
Plates	21.50	22.00	25.50	30.50
Sheets	26.50	29.00	32.50	36.50
Hot strip	17.00	17.50	23.00	28.00
Cold stp.	22.00	22.50	28.50	36.50

Steel Plate

Pittsburgh	2.10c
New York, del.	2.29c
Philadelphia, del.	2.15c
Boston, delivered	2.42c
Buffalo, delivered	2.33c
Chicago or Gary	2.10c
Cleveland	2.10c
Birmingham	2.10c
Coatesville, base	2.10c
Sparrows Point, base	2.10c
Claymont, del.	2.10c
Youngstown	2.10c
Gulf ports	2.45c
Pacific Coast points	2.60c

Steel Floor Plates

Chicago	3.35c
Gulf ports	3.70c
Pacific Coast ports	3.95c
Pittsburgh	3.35c

Standard Shapes

Pittsburgh	2.10c
Philadelphia, del.	2.21½c
New York, del.	2.27c
Boston, delivered	2.41c
Bethlehem	2.10c
Chicago	2.10c
Cleveland, del.	2.30c
Buffalo	2.10c
Gulf ports	2.45c
Birmingham	2.10c
St. Louis, del.	2.34c
Pacific Coast points	2.70c

Tin and Terne Plate

Tin Plate, Coke (base box)

Pittsburgh, Gary, Chicago	$5.00
Granite City, Ill.	5.10

Mfg. Terne Plate (base box)

Pittsburgh, Gary, Chicago	$4.30
Granite City, Ill.	4.40

Bars

Soft Steel

(Base, 3 to 25 tons)

Pittsburgh	2.25c
Chicago or Gary	2.25c
Duluth	2.35c
Birmingham	2.25c
Cleveland	2.25c
Buffalo	2.25c
Detroit, delivered	2.35c
Philadelphia, del.	2.57c
Boston, delivered	2.62c
New York, del.	2.59c
Gulf ports	2.60c
Pacific Coast points	2.85c

Rail Steel

To Manufacturing Trade

Pittsburgh	2.10c
Chicago or Gary	2.10c
Detroit, delivered	2.20c
Cleveland	2.10c

Buffalo	2.10c
Birmingham	2.10c
Gulf ports	2.45c
Pacific coast points	2.70c
Iron	
Terre Haute, Ind.	2.15c
Chicago	2.15c
Philadelphia	2.47c
Pittsburgh, refined	3.50-8.00c
Reinforcing	
New billet, straight lengths, quoted by distributors	
Pittsburgh	2.05c
Chicago, Gary, Buffalo Cleve., Birm., Young., Sparrows Pt.	2.05c
Detroit, delivered	2.15c
Gulf ports	2.40c
Pacific coast ports, f.o.b. car docks	2.50c
Philadelphia, del.	2.22c
Rail steel, straight lengths, quoted by distributors	
Pittsburgh, Gary, Chicago, Buffalo, Cleveland, Birmingham	1.90c
Detroit, delivered	2.00c
Gulf ports	2.25c
Pacific Coast	2.35c

Wire Products

Pitts.-Cleve.-Chicago-Birm. base per 100 lb. keg in carloads

Standard wire nails	$2.45
Cement coated nails	$2.45
(Per pound)	
Polished staples	3.15c
Galv. fence staples	3.40c
Barbed wire, galv.	3.20c
Annealed fence wire	2.95c
Galv. fence wire	3.35c
Woven wire fencing (base C. L. column)	67.00
Single loop bale ties, (base C. L. column)	56.00
To Manufacturing Trade	
Base, Pitts. - Cleve. - Chicago-Birmingham (except spring wire)	
Bright bess., basic wire	2.60c
Galvanized wire	2.65c
Spring wire	3.20c
Worcester, Mass., $2 higher on bright basic and spring wire.	
Cut nails, C. L. Pitts. (10% disc. on all extras)	$3.60

Cold-Finished Bars

	Carbon	Alloy
Pittsburgh	2.70c	3.40c
Chicago	2.70c	3.40c
Gary, Ind.	2.70c	3.40c
Detroit	2.75c	*3.50c
Cleveland	2.70c	3.40c
Buffalo	2.70c	3.40c

*Delivered.

Alloy Bars (Hot)

(Base, 3 to 25 tons)

Pittsburgh, Buffalo, Chicago, Massillon, Canton, Bethlehem 2.80c

Detroit, delivered 2.90c

Alloy	Diff.	Alloy	Diff.
S.A.E.		S.A.E.	
2000	0.35	3100	0.70
2100	0.75	3200	1.35
2300	1.55	3300	3.80
2500	2.25	3400	3.20

4100 0.15 to 0.25 Mo. 150-4600 0.20 to 0.30 Mo. 1.50-2.00 Ni. 1.10

5100 0.80-1.10 Cr.	0.45
5100 Cr. spring flats	0.15
6100 bars	1.20
6100 spring flats	0.85
Cr. N., Van.	1.50
Carbon Van.	0.85
9200 spring flats	0.15
9200 spring rounds, squares	0.40

Electric furnace up 50 cents.

Piling

Pittsburgh	2.40c
Chicago, Buffalo	2.40c
Gulf ports	2.75c

Strip and Hoops

(Base, hot-rolled, 1 to 25 tons; cold-rolled, 3 to 25 tons)

Hot Strip, 12-inch and less

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, Birmingham	2.15c
Detroit, del.	2.25c
Philadelphia, del.	2.47c
New York, del.	2.51c
Cooperage hoop, Youngs., Pitts., Chicago, Birm.	2.25c
Cold strip, 0.25 carbon and under, Pittsburgh, Cleveland, Youngstown	2.95c
Chicago	3.05c
Detroit, del.	3.05c
Worcester, Mass.	3.15c

Carbon	Cleve. Pitts.
0.26—0.50	2.95c
0.51—0.75	4.30c
0.76—1.00	6.15c
Over 1.00	8.35c

Worcester, Mass $4 higher.

Commodity Cold-Rolled Strip

Pitts.-Cleve.-Youngstown	3.10c
Detroit, del.	3.20c
Worcester, Mass.	3.50c

Lamp stock up 10 cents.

Rails, Fastenings

(Gross Tons)

Standard rails, mill	$40.00
Relay rails, Pittsburgh 20—100 lbs.	32.50-35.50
Light rails, billet qual., Pitts., Chicago, B'ham.	$40.00
Do., rerolling quality	39.00
Cents per pound	
Angle bars, billet, mills	2.70c
Do., axle steel	2.35c
Spikes, R. R. base	3.00c
Track bolts, base	4.15c
Car axles forged, Pitts., Chicago, Birmingham	3.15c
Tie plates, base	2.15c

Base, light rails 25 to 60 lbs., 20 lbs., up $2; 16 lbs. up $4; 12 lbs. up $8; 8 lbs. up $10. Base railroad spikes 200 kegs or more; base plates 20 tons.

Bolts and Nuts

Pittsburgh, Cleveland, Birmingham, Chicago. Discounts to legitimate trade as per Dec. 1, 1932, lists, carloads 5% up; full containers additional 10%.

Carriage and Machine

½ x 6 and smaller	65-5-5 off
Do. larger, to 1-in.	60-10-5 off
Do. 1⅛ and larger	60-5-5 off
Tire bolts	50-5 off

Stove Bolts

In packages with nuts attached 75 off; in packages with nuts separate 75-12½ off; bulk 85 off on 15,000 of 3-inch and shorter, or 5000 over 3-inch.

Step bolts	50-10-5-5 off
Elevator bolts	50-10-5-5 off
Plow bolts	65-5-5 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
6-inch and less	65-5	70
⅞-1-inch	60-10	65
1⅛ and larger	60-5	60-5

Hexagon Cap Screws

Milled	50-10 off
Upset, 1-in., smaller	65-10 off

Square Head Set Screws

Upset, 1-in., smaller	73-10 off
Headless set screws	62-10 off

Rivets, Washers

Structural, Pittsburgh, Cleveland, Chicago	3.40c
⅞-inch and smaller, Pitts., Chi., Cleve.	65-10 off
Wrought washers, Pitts., Chi., Phila., to jobbers and large nut, bolt mfrs. l.c.l. $5.40; c.l. $5.75 off	

Welded Iron, Steel Pipe

Base discounts on steel pipe. Pitts., Lorain, O., to consumers in carloads. Gary, Ind., 2 points less on lap weld, 1 point less on butt weld. Chicago delivery 2½ and 1½ less, respectively. Wrought pipe, Pittsburgh base.

Butt Weld

Steel

In.	Blk.	Galv.
½	63½	54
¾	66½	58
1—3	68½	60½
Iron		
⅜	30	13
1—1¼	34	19
1½	38	21½
2	37½	21

Lap Weld

Steel

2	61	52½
2½—3	64	55½
3½—6	66	57½
7 and 8	65	55½
9 and 10	64½	55
11 and 12	63½	54
Iron		
2	30½	15
2½—3½	31½	17½
4	33½	21
4½—8	32½	20
9—12	28½	15

Line Pipe

Steel

1 to 3, butt weld	67½
2, lap weld	60
2½ to 3, lap weld	63
3½ to 6, lap weld	65
7 and 8, lap weld	64
10-inch lap weld	63½
12-inch, lap weld	62½

Iron

	Blk.	Galv.
¾ butt weld	25	7
1 and 1¼ butt weld	29	13
1½ butt weld	33	15½
2 butt weld	32½	15
1½ lap weld	23½	7
2 lap weld	25½	9
2½ to 3½ lap weld	26½	11½
4 lap weld	28½	15
4½ to 8 lap weld	27½	14
9 to 12 lap weld	23½	9

Boiler Tubes

Carloads minimum wall seamless steel boiler tubes, cut lengths 4 to 24 feet; f.o.b. Pittsburgh, base price per 100 feet subject to usual extras.

Lap Welded

Sizes	Gage	Steel	Charcoal Iron
1½" O. D.	13	$ 9.72	$23.71
1¾" O. D.	13	11.06	22.93
2" O. D.	13	12.38	19.35
2¼" O. D.	13	13.79	21.68
2¼" O. D.	12	15.16	.....
2½" O. D.	12	16.58	26.57
2¾" O. D.	12	17.54	29.00
3" O. D.	12	18.35	31.36
3½" O. D.	11	23.15	39.81
4" O. D.	10	28.66	49.90
5" O. D.	9	44.25	73.93
6" O. D.	7	68.14	.....

Seamless

Sizes	Gage	Hot Rolled	Cold Drawn
1" O. D.	13	$ 7.82	$ 9.01
1¼" O. D.	13	9.26	10.67
1½" O. D.	13	10.23	11.79
1¾" O. D.	13	11.64	13.42
2" O. D.	13	13.04	15.03
2¼" O. D.	13	14.54	16.76
2¼" O. D.	12	16.01	18.45
2½" O. D.	12	17.54	20.21
2¾" O. D.	12	18.59	21.42
3" O. D.	12	19.50	22.48
3½" O. D.	11	24.62	28.37
4" O. D.	10	30.54	35.20
4½" O. D.	10	37.35	43.04
5" O. D.	9	46.87	54.01
6" O. D.	7	71.96	82.93

Cast Iron Pipe

Class B Pipe—Per Net Ton

6-in., & over, Birm.	$42.00-43.00
4-in., Birmingham	45.00-46.00
4-in., Chicago	53.80-54.80
6-in. & over, Chicago	50.80-51.80
6-in. & over, east fdy.	46.00
Do., 4-in.	49.00

Class A Pipe $3 over Class B
Stnd. fitgs., Birm., base $100.00

Semifinished Steel

Rerolling Billets, Slabs

(Gross Tons)

Pittsburgh, Chicago, Gary, Cleve., Buffalo, Young., Birm., Sparrows Point	$34.00
Duluth (billets)	36.00
Detroit, delivered	36.00

Forging Quality Billets

6 x 6 to 9 x 9-in., base

Pitts., Chicago, Buffalo	40.00
Duluth	42.00

Sheet Bars

Pitts., Cleveland, Young., Sparrows Point, Buffalo, Canton, Chicago	34.00
Detroit, delivered	36.00

Wire Rods

Pitts., Cleveland, Chicago, Birmingham No. 5 to ⅝-inch incl.	43.00
Do., over ⅝ to 11/32-in. incl.	48.00

Worcester up $2; Galveston up $6; Pacific Coast up $9.

Skelp

Pitts., Chi., Young., Buff., Coatesville, Sparrows Pt.	1.90c

Coke

Price Per Net Ton

Beehive Ovens

Connellsville, fur.	$3.75
Connellsville, fdry.	4.75- 5.50
Connell. prem. fdry.	5.75- 6.25
New River fdry.	6.50- 6.75
Wise county fdry.	5.50- 5.75
Wise county fur.	4.50- 4.75

By-Product Foundry

Newark, N. J., del.	10.88-11.35
Chi., ov., outside del.	9.75
Chicago, del.	10.50
Milwaukee, ovens	10.50
New England, del.	12.50
St. Louis, del.	11.00-11.50
Birmingham, ovens	7.00
Indianapolis, del.	10.00
Cincinnati, del.	9.75
Cleveland, del.	10.30
Buffalo, del.	10.50
Detroit, del.	10.25
Philadelphia, del.	10.65

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	16.00c
Toluol, two degree	22.00c
Solvent naphtha	26.00c
Industrial xylol	26.00c

Per lb. f.o.b. Frankford and St. Louis

Phenol (200 lb. drums)	16.25c
Do. (450 lbs.)	15.25c

Eastern Plants, per lb.

Naphthalene flakes, balls, bbls. to jobbers	5.75c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$28.00

Pig Iron

Delivered prices include switching charges only as noted. No. 2 foundry is 1.75-2.25 sil.; 25c diff. for each 0.25 sil. above 2.25 sil.; 50c diff. below 1.75 sil. Gross tons.

Basing Points:	No. 2 Fdry.	Malleable	Basic	Bessemer
Bethlehem, Pa.	$22.00	$22.50	$21.50	$23.00
Birdsboro, Pa.	22.00	22.50	21.50	23.00
Birmingham, Ala.‡	17.38	.....	16.38	22.00
Buffalo	21.00	21.50	20.00	22.00
Chicago	21.00	21.00	20.50	21.50
Cleveland	21.00	21.00	20.50	21.50
Detroit	21.00	21.00	20.50	21.50
Duluth	21.50	21.50	.....	22.00
Erie, Pa.	21.00	21.50	20.50	22.00
Everett, Mass.	22.75	23.25	22.25	23.75
Granite City, Ill.	21.00	21.00	20.50	21.50
Hamilton, O.	21.00	21.00	20.50	.....
Neville Island, Pa.	21.00	21.00	20.50	21.50
Provo, Utah	19.00	.....	.....	.....
Sharpsville, Pa.	21.00	21.00	20.50	21.50
Sparrow's Point, Md.	22.00	.....	21.50	.....
Swedeland, Pa.	22.00	22.50	21.50	23.00
Toledo, O.	21.00	21.00	20.50	21.50
Youngstown, O.	21.00	21.00	20.50	21.50

‡Subject to 38 cents deduction for 0.70 per cent phosphorus or higher.

Delivered from Basing Points:				
Akron, O., from Cleveland	22.39	22.39	21.89	22.89
Baltimore from Birmingham	22.78	.....	21.66	.....
Boston from Birmingham	22.87	.....	.....	.....
Boston from Everett, Mass.	23.25	23.75	22.75	24.25
Boston from Buffalo	23.25	23.75	22.75	24.24
Brooklyn, N. Y., from Bethlehem	24.50	25.00	.....	.....
Canton, O., from Cleveland	22.39	22.39	21.89	22.89
Chicago from Birminghom	†21.22	.....	.....	.....
Cincinnati from Hamilton, O.	21.24	22.11	21.61	.....
Cincinnati from Birmingham	21.06	.....	20.06	.....
Cleveland from Birmingham	21.32	.....	20.82	.....
Mansfield, O., from Toledo, O.	22.94	22.94	22.44	22.44
Milwaukee from Chicago	22.10	22.10	21.60	22.60
Muskegon, Mich., from Chicago, Toledo or Detroit	24.19	24.19	23.69	24.69
Newark, N. J., from Birmingham	23.15	.....	.....	.....
Newark, N. J., from Bethlehem	23.53	24.03	.....	.....
Philadelphia from Birmingham	22.46	.....	21.96	.....
Philadelphia from Swedeland, Pa.	22.84	23.34	22.34	.....
Pittsburgh district from Neville Island	Neville base, plus 69c, 84c, and $1.24 freight.			
Saginaw, Mich., from Detroit	23.45	23.45	22.95	22.95
St. Louis, northern	21.50	21.50	21.00	.....
St. Louis from Birmingham	†21.12	.....	20.62	.....
St. Paul from Duluth	23.63	23.63	.....	24.13

†Over 0.70 phos.

Low Phos.

Basing Points: Birdsboro and Steelton, Pa., and Standish, N. Y., $26.50, base; $27.74 delivered Philadelphia.

Gray Forge		Charcoal	
Valley furnace	$20.50	Lake Superior fur.	$25.00
Pitts. dist. fur.	20.50	do., del Chicago	28.34
		Lyles, Tenn.	23.50

†Silvery

Jackson county, O., base: 6-6.50 per cent $25.50; 6.51-7—$26.00; 7-7.50—$26.50; 7.51-8—$27.00; 8-8.50—$27.50; 8.51-9—$28.00; 9-9.50—$28.50; Buffalo, $1.25 higher.

Bessemer Ferrosilicon†

Jackson county, O., base; Prices are the same as for silveries, plus $1 a ton.

†The lower all-rail delivered price from Jackson, O., or Buffalo is quoted with freight allowed.

Manganese differentials in silvery iron and ferrosilicon, 2 to 3%, $1 per ton add. Each unit over 3%, add $1 per ton.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$60.80

First Quality

Pa., Ill., Md., Mo., Ky.	47.50
Alabama, Georgia	47.50
New Jersey	52.50

Second Quality

Pa., Ill., Ky., Md., Mo.	42.75
Georgia, Alabama	34.20
New Jersey	49.00

Ohio

First quality	39.90
Intermediate	36.10
Second quality	31.35

Malleable Bung Brick

All bases	$56.05

Silica Brick

Pennsylvania	$47.50
Joliet, E. Chicago	56.05
Birmingham, Ala.	47.50

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$28.00
Wire cut	$26.00

Magnesite

Imported dead - burned grains, net ton f.o.b. Chester, Pa., and Baltimore bases (bags)	$45.00
Do. domestic	40.00
Do., f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00
Quickest magnesite grains, f.o.b. Chewelah, Wash., net ton, bulk	22.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$47.00
Chem. bonded chrome	47.00
Magnesite brick	67.00
Chem. bonded magnesite	57.00

Fluorspar, 85-5

Washed gravel, duty paid, tide, net ton	$21.50
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail $20, barge	$22.00
No. 2 lump	22.00-23.00

Ferroalloy Prices

Ferromanganese, 78-82%, tidewater, duty pd. $80.00; Do., del. Pittsburgh 85.27

Spiegeleisen, 19-21% dom. Palmerton, Pa., spot 28.00; Do., 26-28%, Palmerton 33.00

Ferrosilicon, 50% freight allowed, c.l. 69.50; Do., ton lot 80.50; Do., 75 per cent 126.00. Spot, $5 a ton higher.

Silicoman, 2½ carbon 88.00; 2% carbon, 93.00; 1%, 103.00. Contract ton price $11 higher; spot $5 over contract.

Ferrotungsten, stand., lb. con. del. cars 1.65-1.70

Ferrovanadium, 35 to 40%, lb., cont. 2.70-2.80-2.90

Ferrophosphorus, gr. ton, c.l., 17-18% Rockdale, Tenn., basis, 18%, $3 unitage, 58.50; electrolytic, per ton, c. l., 23-26% f.o.b. Monsanto, Tenn., 24% $3 unitage 75.00

Ferrochrome, 66-70 chromium, 4-6 carbon, cts. lb., contained cr., del. carlots 10.50c; Do., ton lots 11.25c; Do., less-ton lots 11.50c

67-72% carloads, 2% carbon, per lb. contained chrome 16.50c; Do., ton lots 17.25c; Do., less-ton lots 17.75c

	Carloads	Ton lots	Less ton
2% carb.	16.50c	17.25c	17.50c
1% carb.	17.50c	18.25c	18.50c
0.10% carb.	18.50c	19.25c	19.50c
0.20% carb.	19.50c	20.25c	20.50c

Spot ¼c higher

Ferromolybdenum, 55-65% molyb. cont., f.o.b. mill, lb. 0.95

Calcium molybdate, lb. molyb. cont., f.o.b. mill 0.80

Ferrotitanium, 40-45%, lb., con. ti., f.o.b. Niagara Falls, ton lots $1.23; Do., less-ton lots 1.25

20-25% carbon, 0.10 max., ton lots, lb. 1.35; Do, less-ton lots 1.40

Spot 5c higher

Ferrocolumbium, 50-60%, contract, lb. con. col., f.o.b. Niagara Falls $2.25; Do, less-ton lots 2.30

Spot is 10c higher

Technical molybdenum trioxide, 53 to 60% molybdenum, lb. molyb. cont., f.o.b. mill 0.80

Ferro-carbon-titanium, 15-18%, ti., 6-8% carb., carlots, contr., net ton $142.50; Do, spot 145.00; Do, contract, ton lots 145.00; Do, spot, ton lots 150.00

15-18% ti., 3-5% carbon, carlots, contr., net ton 157.50; Do, spot 160.00; Do, contract, ton lots. 160.00; Do, spot, ton lots 165.00

Alsifer, contract carlots, f.o.b. Niagara Falls, lb. 7.50c; Do, ton lots 8.00c; Do, less-ton lots 8.50c

Spot ½c lb. higher

Chromium Briquets, contract, any quantity, freight allowed, lb. 7.25c; Do, spot carlots, bulk 7.50c; Do, ton lots 8.00c; Do., less-ton lots 8.25c

Tungsten Metal Powder, according to grade, spot shipment, 200-lb. drum lots, lb. $2.05; Do, smaller lots 2.15

Vanadium Pentoxide, contract, lb. contained $1.10; Do, spot 1.15

Chromium Metal, 98% cr., 0.50 carbon max., contract, lb. con. chrome 80.00c; Do, spot 85.00c

88% chrome, contract 79.00c; Do, spot 84.00c

Silicon Metal, 1% iron, contract, carlots, 2 x ⅛-in., lb. 14.00c; Do, 2% 12.50c

Spot ¼c higher

Silicon Briquetes, contract, carloads freight allowed, ton $69.50; Carload, spot 74.50; Less-ton lots, lb. 3.75c

Manganese Briquets, contract carloads, bulk freight allowed, lb. 4.50c; Ton lots 5.00c; Less-ton lots 5.25c

Spot ¼c higher

Zirconium Alloy, 12-15%, contract, carloads, gross ton $97.50; Do, spot 102.50

34-40%, contract, carloads, lb., alloy 14.00c; Do, ton lots 15.00c; Do, less-ton lots 16.00c

Spot ¼c higher

Molybdenum Powder, 99%, f.o.b. York, Pa. 200-lb. kegs, lb. $2.60; Do, 100-200 lb. lots 2.75; Do, under 100-lb. lots 3.00

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials

	Soft Bars	Bands	Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets Hot Rolled	Sheets Cold Rolled	Sheets Galv. No. 24
Boston	3.98	4.21	5.21	3.85	3.85	5.66	3.86	4.93	4.76
New York (Metropolitan)	3.94	4.11	4.11	3.76	3.75	5.56	3.73	4.90	4.50
Philadelphia	3.60	3.60	4.10	3.40	3.40	5.00	3.40	....	4.33
Baltimore	3.80	3.95	4.35	3.65	3.65	5.00	3.70	5.05	4.30
Norfolk, Va.	4.00	4.15	4.55	3.85	3.85	5.20	3.90	4.80	5.40
Buffalo	3.60	3.97	3.97	3.77	3.55	5.40	3.50	4.55	4.40
Pittsburgh	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.60	4.50
Cleveland	3.50	3.65	3.65	3.55	3.73	5.33	3.50	4.70	4.62
Detroit	3.43	3.58	3.83	3.75	3.80	5.42	3.58	4.65	4.74
Cincinnati	3.85	3.82	3.82	3.80	3.83	5.43	3.57	....	4.57
Chicago	3.60	3.75	3.75	3.55	3.55	5.15	3.50	4.45	4.50
Minneapolis	3.85	4.00	4.00	3.80	3.80	5.40	3.75	5.10	4.75
Milwaukee	3.73	3.88	3.88	3.68	3.68	5.28	3.63	4.58	4.63
St. Louis	3.87	4.02	4.02	3.82	3.82	5.42	3.77	4.72	4.77
Kansas City	4.15	4.30	4.30	4.10	4.10	5.70	4.10	....	4.75
Memphis	4.00	4.15	4.15	3.95	3.95	5.71	3.90	....	5.25
Chattanooga	3.90	4.05	4.05	3.85	3.85	5.80	3.80	....	4.40
Tulsa, Okla.	4.64	4.79	4.79	4.59	4.59	6.19	4.54	....	5.54
Birmingham, Ala.	3.50	3.65	3.65	3.45	3.45	5.83	3.40	....	4.75
New Orleans	3.85	4.65	4.65	3.80	3.80	5.75	4.10	....	4.60
Houston, Tex.	3.50	5.85	6.25	4.05	4.05	5.65	3.95	....	5.25
Seattle	4.30	4.50	5.85	4.05	4.15	5.90	3.95	....	5.25
Portland, Oreg.	4.00	4.40	6.10	4.00	4.00	5.20	3.95	6.50	4.75
Los Angeles	4.00	4.50	6.35	4.00	4.00	6.20	4.20	6.30	5.05
San Francisco	4.05	4.45	6.00	4.00	4.00	5.60	4.00	6.40	5.15

	Cold Rolled Strip	Cold Finished Bars	SAE Hot-rolled Bars (Unannealed) 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series	SAE Cold Drawn Bars 2300	SAE Cold Drawn Bars 3100
Boston	3.61	4.43	4.28	7.65	6.25	6.00	8.05	8.73	7.33
New York	3.66	4.39	4.14	7.50	6.10	5.85	....	8.69	7.29
Philadelphia	3.66	4.36	3.85	7.46	6.06	5.81	8.71	....	....
Baltimore	....	4.35	3.95	....	....	....	....	....	....
Norfolk, Va.	....	4.60	....	....	....	....	....	....	....
Buffalo	3.57	4.05	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Pittsburgh	3.35	3.95	3.80	7.35	5.95	5.70	7.75	8.35	6.95
Cleveland	3.35	4.05	3.70	7.45	6.05	6.05	7.85	8.25	6.85
Detroit	3.55	3.60	3.58	7.57	6.17	5.92	7.30	8.55	7.15
Cincinnati	3.60	4.30	3.90	7.59	6.19	5.94	8.99	8.60	7.20
Chicago	3.65	4.05	3.80	7.25	5.85	5.60	7.65	8.25	6.85
Minneapolis	....	4.64	4.00	7.60	6.20	8.79	9.34	8.94	7.54
Milwaukee	....	4.18	3.93	7.48	6.08	5.85	7.88	8.48	7.08
St. Louis	3.76	4.32	4.07	7.62	6.22	5.97	8.02	8.62	7.22
Kansas City	4.46	4.60	....	....	....	....	....	....	....
Memphis	....	4.61	....	....	....	....	....	....	....
Chattanooga	....	4.90	....	....	....	....	....	....	....
Tulsa, Okla.	....	5.09	....	....	....	....	....	....	....
Birmingham, Ala.	....	4.73	....	....	....	....	....	....	....
New Orleans	5.00	5.10	....	....	....	....	....	....	....
Seattle	....	5.60	5.65	....	7.80	7.65	8.45	....	....
Portland, Oreg.	....	5.60	6.10	9.00	8.00	7.85	8.70	....	....
Los Angeles	4.45	6.00	4.65	9.40	8.55	8.40	9.05	10.40	9.55
San Francisco	*9.30	6.55	5.20	9.65	8.80	8.65	9.30	10.65	9.80

* Based on minimum quantity.

CURRENT IRON AND STEEL PRICES OF EUROPE

Dollars at Rates of Exchange, Feb. 9

Export Prices f. o. b. Port of Dispatch—

By Cable or Radio

	British gross tons U. K. ports £ s d	Quoted in dollars at current value	Continental Channe or North Sea ports, gross tons **Quoted in gold pounds sterling £ s d
Foundry, 2.50-3.00 Si.	$23.40 5 0 0	$16.83	1 19 6
Basic bessemer	....	15.98	1 17 6
Hematite, Phos. .03-.05	26.91 5 15 0*	.....	.....
Billets	$34.52 7 7 6	$42.60	5 0 0
Wire rods, No. 5 gage	53.24 11 7 6	43.66	5 2 6
Standard rails	$44.46 9 10 0	$48.99	5 15 0
Merchant bars	2.30c 11 0 0	1.95c to 2.05c	5 0 0 to 5 5 0
Structural shapes	2.09c 10 0 0	1.90c	4 17 6
Plates, †¼ in. or 5 mm.	2.29c 10 18 9	2.19c to 2.39c	5 12 6 to 6 2 6
Sheets, black, 24 gage or 0.5 mm	2.72c 13 0 0	2.93c	7 10 0°
Sheets, gal., 24 ga., corr.	3.29c 15 15 0	3.48c	9 3 0
Bands and strips	2.77c 13 5 0	2.05c	5 5 0
Plain wire, base	4.08c 19 10 0	2.39c to 2.83c	6 2 6 to 7 5 0
Galvanized wire, base	4.86c 23 5 0	3.07c to 3.17c	7 17 6 to 8 2 6
Wire nails, base	.....	2.73c to 2.93c	7 0 0 to 7 10 0
Tin plate, box 108 lbs.	$ 4.73 1 0 3	.....	.....

British ferromanganese $80.00 delivered Atlantic seaboard duty-paid.

Domestic Prices at Works or Furnace—

Last Reported

	£ s d		French Francs		Belgian Francs		Reich Mark
Fdy. pig iron, Si. 2.5	$23.17	4 19 0(a)	$15.85	598	$16.90	500	$25.28	63
Basic bess. pig iron	21.65	4 12 6(a)	.....	...	.....	...	27.89	(b)69.50
Furnace coke	5.38	1 4 2	5.96	225	7.27	215	7.62	19
Billets	34.52	7 7 6	25.04	945	29.07	860	38.73	96.50
Standard rails	1.99c	9 10 0	1.56c	1,300	2.06c	1,375	2.38c	132
Merchant bars	2.42c	11 12 0††	1.44c	1,202	1.65c	1,100	1.98c	110
Structural shapes	2.17c	10 8 0††	1.41c	1,173	1.65c	1,100	1.93c	107
Plates, †¼-in. or 5 mm	2.29c	10 19 3††	1.82c	1,515	2.06c	1,375	2.29c	127
Sheets, black	3.08c	14 15 0§	2.17c	1,805‡	2.36c	1,575‡	2.59c	144‡
Sheets, galv., corr., 24 ga. or 0.5 mm	3.61c	17 5 0	3.24c	2,700	4.13c	2,750	6.66c	370
Plain wire	4.08c	19 10 0	1.98c	1,650	2.48c	1,650	3.11c	173
Bands and strips	2.58c	12 7 0††	1.71c	1,340	1.95c	1,300	2.29c	127

*Basic. †British ship-plates. Continental, bridge plates. §24 ga. ‡1 to 3 mm. basic price. British quotations are for basic open-hearth steel. Continent usually for basic-bessemer steel. (a) del. Middlesbrough. 5s rebate to approved customers. (b) hematite. °Close annealed. ††Rebate of 15s on certain conditions.

**Gold pound sterling carries a premium of 75 per cent over paper sterling.

IRON AND STEEL SCRAP PRICES

Corrected to Friday night. Gross tons delivered to consumers, except where otherwise stated; † indicates brokers prices

HEAVY MELTING STEEL

Birmingham, No. 1	†12.00
Bos. dock No. 1 exp.	13.00-13.50
New Eng. del. No. 1	14.00
Buffalo, No. 1	13.75-14.25
Buffalo, No. 2	12.00-12.50
Chicago, No. 1	13.50-14.00
Chicago, auto, no alloy	12.00-12.50
Chicago, No. 2 auto	11.00-11.50
Cincinnati, dealers	11.50-12.00
Cleveland, No. 1	13.50-14.00
Cleveland, No. 2	12.50-13.00
Detroit, No. 1	10.00-10.50
Detroit, No. 2	9.00- 9.50
Detroit (industrial)	10.50-11.00
Eastern Pa., No. 1	15.00-15.50
Eastern Pa., No. 2	13.00-13.50
Federal, Ill.	11.75-12.25
Granite City, R. R.	12.50-13.00
Granite City, No. 2	11.75-12.25
Los Angeles, No. 1	12.50-13.00
Los Angeles, No. 2	11.50-12.00
N. Y. dock No. 1 exp.	12.00-12.50
Pitts., No. 1 (R. R.)	16.25-16.75
Pittsburgh, No. 1	15.50-16.00
Pittsburgh, No. 2	14.75-15.25
St. Louis, R. R.	12.50-13.00
St. Louis, No. 2	12.00-12.50
San Francisco, No. 1	12.00
Seattle, No. 1	12.00
Toronto, dirs. No. 1	9.75-10.25
Valleys, No. 1	14.50-15.00

COMPRESSED SHEETS

Buffalo	12.00-12.50
Chicago, factory	12.50-13.00
Chicago, dealer	11.50-12.00
Cincinnati, del.	11.00-11.50
Cleveland	13.50-14.00
Detroit	11.75-12.25
E. Pa., new mat.	15.50
E. Pa., old mat.	11.00-11.50
Los Angeles	12.50-13.00
Pittsburgh	15.50-16.00
St. Louis	9.50-10.00
Valleys	14.25-14.75

BUNDLED SHEETS

Buffalo, No. 1	12.00-12.50
Buffalo, No. 2	11.00-11.50
Cleveland	10.00-10.50
Los Angeles	14.00
Pittsburgh	14.75-15.25
St. Louis	8.50- 9.00
Toronto, dealers	4.00

SHEET CLIPPINGS, LOOSE

Chicago	8.50- 9.00
Cincinnati, dealers	7.00- 7.50
Detroit	8.50- 9.00
†Los Angeles	3.75- 4.00
St. Louis	7.50- 8.00

BUSHELING

Buffalo, No. 1	12.00-12.50
Chicago No. 1	12.00-12.50
Cincin., No. 1, deal.	8.00- 8.50
Cincinnati, No. 2	3.50- 4.00
Cleveland, No. 2	7.25- 7.75
Detroit, No. 1, new	10.00-10.50
Valleys, new, No. 1	13.75-14.25
Toronto, dealers	4.00

MACHINE TURNINGS (Long)

Birmingham	†4.50- 5.00
Buffalo	7.00- 7.50
Chicago	6.75- 7.25
Cincinnati, dealers	4.75- 5.25
Cleveland	7.00- 7.50
Detroit	5.75- 6.25
Eastern Pa.	9.00- 9.50
Los Angeles	4.50- 5.00
New York	†3.50- 4.00
Pittsburgh	9.50-10.00
St. Louis	3.00- 4.00
Toronto, dealers	4.00- 4.50
Valleys	9.00- 9.50

SHOVELING TURNINGS

Buffalo	7.25- 8.00
Cleveland	7.50- 8.00
Chicago	8.50- 9.00
Detroit	6.50- 7.00
Pitts., alloy-free	11.25-11.75

BORINGS AND TURNINGS

For Blast Furnace Use

Boston district	2.00
Buffalo	7.00- 7.25
Cincinnati, dealers	3.50- 4.00
Cleveland	7.50- 8.00
Eastern Pa.	6.50- 7.00
Detroit	5.75- 6.25
New York	†2.50- 3.00
Pittsburgh	8.25- 8.75
Toronto, dealers	5.00- 5.50

AXLE TURNINGS

Boston district	†7.50
Buffalo	9.50-10.00
Chicago, elec. fur.	13.00-13.50
East. Pa., elec. fur.	13.00-13.50
St. Louis	9.50-10.00
Toronto	4.00- 4.50

CAST IRON BORINGS

Birmingham	†6.00- 6.50
Boston dist. chem.	†6.00- 6.25
Buffalo	7.50- 8.00
Chicago	5.50- 6.00
Cincinnati, dealers	3.50- 4.00
Cleveland	7.25- 7.75
Detroit	5.75- 6.25
E. Pa., chemical	10.00-11.00
New York	†3.50- 4.00
St. Louis	2.50- 3.00
Toronto, dealers	3.50

RAILROAD SPECIALTIES

Chicago	15.50-16.00

ANGLE BARS—STEEL

Chicago	15.00-15.50
St. Louis	14.00-14.50

SPRINGS

Buffalo	16.00-16.50
Chicago, coil	16.00-16.50
Chicago, leaf	15.75-16.25
Eastern Pa.	17.00-17.50
Pittsburgh	17.50-18.00
St. Louis	15.50-16.00

STEEL RAILS, SHORT

Birmingham	†12.00-12.50
Buffalo	17.00-17.50
Chicago (3 ft.)	15.50-16.00
Chicago (2 ft.)	16.00-16.50
Cincinnati, dealers	16.75-17.25
Detroit	16.50-17.00
Los Angeles	15.00-15.50
Pitts., 3 ft. and less	18.00-18.50
St. Louis, 2 ft. & less	16.25-16.75

STEEL RAILS, SCRAP

Boston district	†13.50-14.00
Buffalo	16.00-16.50
Chicago	14.00-14.50
Cleveland	17.00-17.50
Pittsburgh	17.50-18.00
St. Louis	14.00-14.50
Seattle	16.00

FROGS, SWITCHES

Chicago	13.50-14.00
St. Louis, cut	14.25-14.75

ARCH BARS, TRANSOMS

St. Louis	14.00-14.50

PIPE AND FLUES

Chicago, net	9.00- 9.50
Cincinnati, dealers	7.25- 7.75

RAILROAD GRATE BARS

Buffalo	10.00-10.50
Chicago, net	8.50- 9.00
Cincinnati, dealers	7.00- 7.50
Eastern Pa.	13.50-14.00
New York	†8.50- 9.00
St. Louis	9.50-10.00

RAILROAD WROUGHT

Birmingham	†11.00-11.50
Boston district	†9.50-10.00
Eastern Pa., No. 1	15.50-16.00
St. Louis, No. 1	10.75-11.25
St. Louis, No. 2	12.25-12.75
Toronto, No. 1 dlr.	8.00

FORGE FLASHINGS

Boston district	†8.00- 8.25
Buffalo	12.00-12.50
Cleveland	11.50-12.00
Detroit	10.00-10.50
Los Angeles	9.00
Pittsburgh	14.50-15.00

FORGE SCRAP

Boston district	†6.50
Chicago, heavy	16.50-17.00

LOW PHOSPHORUS

Buffalo, crops	16.50-17.00
Cleveland, crops	18.00-18.50
Eastern Pa., crops	17.00-17.50
Pitts., billet, bloom, slab crops	18.75-19.25

LOW PHOS. PUNCHINGS

Buffalo	15.50-16.00
Chicago	16.00-16.50
Eastern Pa.	17.50-18.00
Pittsburgh	17.50-18.00
Seattle	15.00

RAILS FOR ROLLING

5 feet and over

Birmingham	†14.00-15.00
Boston	15.00-15.50
Chicago	17.00-17.50
New York	†14.50-15.00
Eastern Pa.	17.00-17.50
St. Louis	17.00-17.50

STEEL CAR AXLES

Birmingham	†15.00-16.00
Buffalo	16.50-17.00
Boston district	†16.00-16.50
Chicago, net	18.00-18.50
Eastern Pa.	21.00-21.50
St. Louis	18.50-19.00

LOCOMOTIVE TIRES

Chicago (cut)	16.00-16.50
St. Louis, No. 1	13.50-14.00

SHAFTING

Boston district	†15.25-15.50
New York	†15.50-16.00
Eastern Pa.	20.50-21.00
St. Louis, 1¼-3¾"	17.00-17.50

CAR WHEELS

Birmingham	†13.50-14.00
Boston dist., iron	†11.00
Buffalo, steel	16.50-17.00
Chicago, iron	13.50-14.00
Chicago, rolled steel	15.00-15.50
Cincin., iron, deal.	13.50-14.00
Eastern Pa., iron	16.50-17.00
Eastern Pa., steel	17.00-17.50
Pittsburgh, iron	15.00-15.50
Pittsburgh, steel	17.50-18.00
St. Louis, iron	15.50-16.00
St. Louis, steel	15.00-15.50

NO. 1 CAST SCRAP

Birmingham	†13.00-13.50
Boston, No. 1 mach.	†10.50-10.75
N. Eng. del. No. 2	12.00-12.50
N. Eng. del. textile	12.50-13.00
Buffalo, cupola	14.50-15.00
Buffalo, mach.	15.50-16.00
Chicago, agri. net	10.50-11.00
Chicago, auto net	12.00-12.50
Chicago, railr'd net	11.00-11.50
Chicago, mach. net	12.00-12.50
Cincin., mach. deal.	13.50-14.00
Cleveland, mach. net	16.75-17.25
Eastern Pa., cupola	16.50-17.00
E. Pa., mixed yard	14.50
Los Angeles, net	13.50-14.00
Pittsburgh, cupola	15.25-15.75
San Francisco, del.	13.50-14.00
Seattle	12.00-14.50
St. Louis, cupola	12.00-12.50
St. Louis, agri. mach.	14.00-14.50
St. L., No. 1 mach.	15.00-15.50
Toronto, No. 1, mach., net	12.00-13.00

HEAVY CAST

Boston dist. break.	†10.00-10.25
New England, del.	12.50-13.00
Buffalo, break.	11.00-11.50
Cleveland, break, net	13.00-13.50
Detroit, auto net	13.00-13.50
Detroit, break	9.50-10.00
Eastern Pa.	15.50
Los Ang., auto, net	13.00-13.50
New York, break.	†11.00-11.50
Pittsburgh, break	13.25-13.75

STOVE PLATE

Birmingham	†7.50- 8.00
Boston district	†8.00- 8.25
Buffalo	13.00-13.50
Chicago, net	8.50- 9.00
Cincinnati, dealers	7.00- 7.50
Detroit, net	8.50- 9.00
Eastern Pa.	13.50
New York, fdy.	†10.00-10.50
St. Louis	8.00- 8.50
Toronto dealers, net	7.50- 8.00

MALLEABLE

Birmingham, R. R.	†10.50-11.00
New England, del.	14.50-15.00
Buffalo	13.50-14.00
Chicago, R. R.	15.00-15.50
Cincin., agri. deal.	12.00-12.50
Cleveland, rail	15.00-15.50
Eastern Pa., R. R.	15.00-16.50
Los Angeles	17.50-18.00
Pittsburgh, rail	14.25-14.75
St. Louis, R. R.	12.00-13.00

Iron Ore

Lake Superior Ore

Gross ton, 51½%

Lower Lake Ports

Old range bessemer	$5.25
Mesabi nonbes.	4.95
High phosphorus	4.85
Mesabi bessemer	5.10
Old range nonbes.	5.10

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56.63% con.	9.00-9.25
Cop.-free low phos. 58-60%	nominal

Foreign Ore

Cents per unit, c.i.f. Atlantic

Foreign manganiferous ore, 45.55% iron, 6-10% man. nom.	12.00
No. Afr. low phos.	12.50-13.00
Swedish low phos.	12.50-13.00
Spanish No. Africa basic, 50 to 60% nom.	11.00
Tungsten. sh. ton. unit, duty pd. nom.	19.00
N. F., fdy., 55%	7.00
Chrome ore, 48% gross ton, c.i.f.	$23.00-24.00
Molybdenum ores sulphide, per lb. molybdenum contained, f.o.b. mill	0.75

Manganese Ore

Prices not including duty, cents per unit cargo lots.

Caucasian, 50-52% nom.	30.00-31.00
So. African, 50-52% nom.	30.00-31.00
Indian, 49-50%	29.00-30.00

Sheets, Strip

Sheet and Strip Prices, Pages 84, 85

Pittsburgh—Flat-rolled steel sales and production generally are marking time, although the tendency in output is downward. Automotive orders have been scant despite good assemblies, but the industry is believed to be nearing stock depletion that will be followed by larger placements. In such an event better price resistance is looked for than occurred last fall, particularly since business is commencing to improve in other directions. Sheet production lately has continued slightly less than 60 per cent, with strip output just below 45 per cent.

Cleveland — Specifications are off slightly since a month ago, but renewed automotive buying is looked for late this month. Despite heavy shipments of sheets and strip the past few months, consumers' inventories are excessive in only a few instances. Mill backlogs now are light, with early delivery available. Prices are steady.

Chicago — Business in sheets and strip is unchanged, and backlogs are declining. Automotive demand is below expectations, while the upturn in needs of farm equipment builders has been only moderate. Better orders from both groups is looked for, although not immediately.

New York — A small increase in sheet specifications so far this month reflects not only stock replenishment but also better releases from household appliance makers who anticipate better business this year than last. This view is based partly on expectations of improved residential construction, a trend indicated by January permits here which were the largest for that month since 1929. Seaboard Steel Products Corp. has booked 1600 tons of steel lath and small shapes for the Queensbridge housing development here. This tonnage, let through William J. Scully Co., New York, will be fabricated by the Goldsmith Metal Lath Co., Cincinnati.

Buffalo—New business in sheets and strip is slow, and production continues to taper. However, sellers look for an upturn soon.

Philadelphia — Large automotive interests here are expected in the market later this month. Automotive buyers so far have been unable to uncover price concessions, despite recent talk to this effect. Some consumers, especially stove and sign makers, are working off stocks purchased last quarter. Job stampers are more active, one shop operating three shifts. Galvanized sheet market has not been affected by the revision here in jobbers' prices, establishing the latter practically on a mill basis.

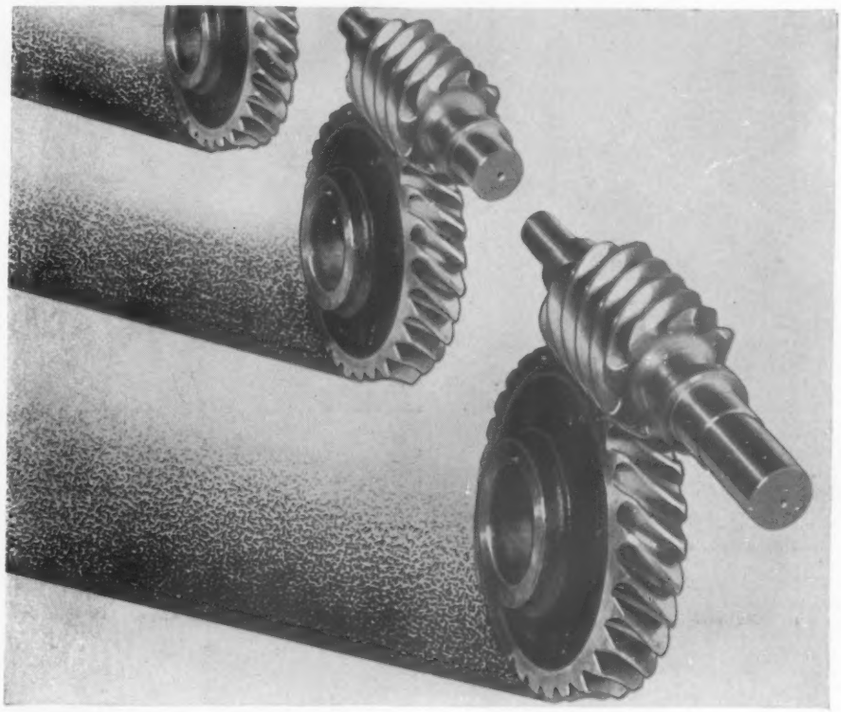
Cincinnati—Sheet demand shows little change. Automotive needs barely are holding to the January level, but some seasonal upturn has occurred in consumption by stove and refrigerator makers. Galvanized demand also is tending upward. Despite low inventories consumers are buying cautiously.

Birmingham, Ala. — While strip, consisting largely of cotton ties as far as this district is concerned, is being produced only in small amounts and on infrequent schedules, production of sheets continues at capacity, both here and at Gadsden. No special pressure for delivery is being made.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 85

Business in bolts and nuts is leveling off, following the January up-



Masters OF THEIR DESTINIES

★ Horsburgh and Scott Worms and Gears are correctly designed, engineered and built with a precision in manufacture that make them absolute masters of their destinies from the first turn and throughout their Long Life. They are easy to install, they work right from the beginning and give the finest service possible. H & S Worms and Gears are more economical too, because they're made right and last longer.

Send name on Company Letterhead for 448-page Catalog

THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVENUE, CLEVELAND, OHIO, U. S. A.

turn. Last month's sales were better than expected since heavy contracting late in 1938 at price concessions was expected to retard buying on the opening of the new year. Railroad demand is slightly heavier in some districts, with additional business pending. A large tonnage remains to be placed for current and prospective shipbuilding and structural work.

Rivet prices are holding firm, while bolt and nut quotations retain the stronger position acquired last month.

Plates

Plate Prices, Page 84

Cleveland — Inquiries for boiler and miscellaneous repairs prior to opening of the lake navigation season have not yet appeared. Tonnage involved in this work is expected to be larger than a year ago, since operators anticipate a more active season. Railroad demand is restricted to necessary repairs. Plate sellers look for a small drop in shipments this month. Outstanding recent inquiry involves 1700 tons of 72-inch steel pipe for a waterworks improvement project for the city of Toledo, O. Bids are due Feb. 24.

New York — Plates have moved slowly so far this month. Demand from railroads and oil companies is sluggish, and tank and boiler work still drags. Pending business includes 3500 tons for a Boston siphon on which new bids will be asked. Ship work continues encouraging, with two large tankers, involving about 10,000 tons of steel, pending for Socony-Vacuum Oil Co. Inc. About 93,000 tons additional is in prospect for other ships either placed or up for bids soon.

Philadelphia — Harrisburg, Pa., opens bids shortly on 20 miles of water line pipe taking over 1000 tons of plates. Some district mills are more active on pipe line, oil country, railroad and ship work, along with some business from makers of light tanks. Shipyards have released additional tonnage, and it is reported the Camden yard will buy soon for a large program. The Chester yard may build two additional ways, it is understood. Export demand is slow, with prices weak.

Birmingham, Ala. — Plate business, already rather substantial because of freight car orders and some miscellaneous business, gives promise of becoming one of the district's largest factors with new tonnage in sight from resumption of shipbuilding. Specifications on more than 20,000 tons are expected to be let shortly by Ingalls Iron Works, which has contract for four cargo carriers for the government.

San Francisco—The largest plate letting involved 400 tons of plates and shapes for a tank and pumping plants for Tucson, Ariz. Awards aggregated 770 tons, bringing the total to date to 11,448 tons, compared with 8896 tons for the corresponding period in 1938.

Seattle — Subcontract for fabricating about 1200 tons of plates and shapes for the Puget Sound navy yard gate caisson is reported awarded to Moore Dry Dock Co., Oakland, Calif., by Winslow Marine Railway & Shipbuilding Co., Seattle, general contractor. New bids for a steel motor-driven bulk oil carrier for Petroleum Navigation Co., Seattle, have been taken.

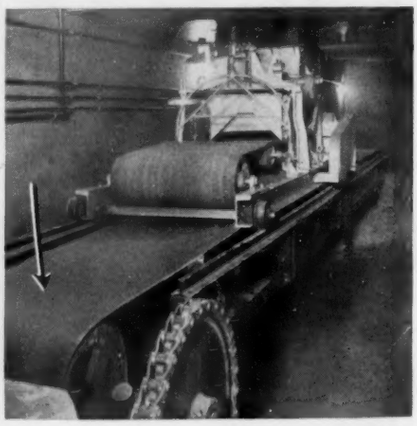
Plate Contracts Placed

1200 tons, caisson gate for Puget Sound navy yard, to Moore Dry Dock Co., Oakland, Calif.; Winslow Marine Railway & Shipbuilding Co., Seattle, general contractor.

490 tons, two barges, Ashland Oil Refining Co., Leetsdale, Pa., one to Na-

Stearns

IMPROVED MAGNETIC PULLEYS



Protects coal crusher in prominent mid-west cement plant.*

The Stearns High Duty Improved Magnetic Pulley incorporates many features which are basic in magnet design principle, the result of nearly forty years' development experience. Each detail contributes a maximum magnetic intensity, depth of field, uniform flux distribution and a scientific application of the elements used in its construction.

Magnetic pulleys are as important as the conveyor in which they are used. In the Stearns High Duty Improved Magnetic Pulley there is always sufficient magnetic power in reserve to handle a peak load.

FOR COMPLETE INFORMATION AND DETAILS WRITE FOR BULLETIN NO. 301.

* *Name on application.*

STEARNS MAGNETIC MFG. CO.

Formerly Magnetic Mfg. Co.

SEPARATORS DRUMS ROLLS HIGH STEARNS DUTY CLUTCHES BRAKES MAGNETS

LARGEST EXCLUSIVE BUILDERS OF MAGNETIC EQUIPMENT

650 So. 28th Street Milwaukee, Wis.

tional Bridge Co., Nashville, Tenn., and one to Ingalls Iron Works, Birmingham, Ala.
400 tons, tank and pumping station, Tucson, Ariz., to unnamed interest.
310 tons, standpipes, Morganton, N. C., to Ingalls Iron Works, Birmingham, Ala.

Plate Contracts Pending

1700 tons, waterworks improvement, Toledo, O.; 2600 feet of 72-inch and 4200 feet of 72-inch steel pipe; bids Feb. 24.
Unstated tonnage, 100,000-gallon elevated water tank and tower, veterans' hospital, Montgomery, Ala.; bids March 7, Washington.

Bars

Bar Prices, Page 84

Cleveland—A tapering in automotive needs, regarded as only temporary, has curtailed bar mill operations. Demand from farm equipment interests is slow to appear, while specifications from railroads and road building equipment builders is unchanged. While February is expected to show a letdown in bar bookings, inquiries point to heavier production through spring.

Chicago — Bar demand is sustained, although the sales trend for different producers is mixed. Farm equipment needs have been outstanding in business of some mills, with industrial truck and tractor requirements also lending considerable support. Automotive interests are ordering cautiously, and miscellaneous demand is unchanged. Current volume of business is expected to be maintained the remainder of the month.

New York—Special alloy bars are relatively more active than plain carbon grades, due to brisk demand from government shops and airplane and machine tool builders. Automobile accessory needs are expected to be heavier this month, although to date there has been little improvement. Carbon bar demand shows some pickup, with shipyards specifying more freely and slightly better releases from railroads.

Philadelphia — Forging bars are more active, with some shops reporting recent sales the heaviest in over a year. Both private and government work is included. Cold-drawn and alloy bars are moving fairly well to the machinery trade. Warehouses are accounting for a moderate volume, including carbon grades.

Buffalo — Recent improvement in bar demand is maintained, chiefly due to support from the automotive industry. Sustained activity in bars is in contrast to the downward tendency in some other steel products.

Birmingham, Ala. — Output of bars, especially reinforcing bars, is gratifying. A large tonnage is going into highway and bridge construction, and production is at approximately 80 per cent.

Pipe

Pipe Prices, Page 85

Pittsburgh—Demand for oil country goods is expected to be the leading factor in improved business this month in tubular products. Standard pipe is moving steadily to jobbers as building requirements continue to take sustained tonnages. Automotive releases provide an even flow of mechanical tubing, but other classifications are slow.

Cleveland — Jobbers' pipe shipments are slightly lower than a month ago, but inquiries point to better demand early in March. Improved call from small municipalities for water system extensions and other improvements also is indicated for spring. Backlogs of cast pipe

INLAND
4-WAY
Floor Plate
Safe floors save time in addition to preventing accidents. Inland's 4-Way safety tread provides dependable traction in all directions, for feet and wheels. No plant can be efficient with bad floors. Make yours right for years to come with Inland 4-Way Floor Plate.
Order from your Jobber or write for 16-page Floor Plate Booklet
INLAND STEEL CO.
38 SOUTH DEARBORN STREET, CHICAGO
Sheets • Strip • Tin Plate • Bars • Plates • Structurals • Piling • Rails • Reinforcing Bars

producers are deferring deliveries on some new business until April. Cast and steel prices are firm.

Chicago — Cast pipe business is quieter, with private work yet to improve. United States Pipe & Foundry Co. is low on 1080 tons for Chicago. The city also is inquiring for 12,550 bronze gate valves.

Birmingham, Ala. — Pipe plants are experiencing some slackening of spot lettings since the first of the year and some disappointment has been expressed at failure of tonnage to hold up as had been expected. A four-day week was general last week, but the schedule probably will go back to three days this week.

New York — Stronger prices pervade the resale pipe market, aided by rather general improvement in demand and a better outlook. Shipments have been increased by the ending of the strike of plumbing supply truckers.

San Francisco—The largest cast iron pipe award of the year has just been made by Los Angeles, 2500 tons of 4 to 12-inch. United States Pipe & Foundry Co., American Cast Iron Pipe Co. and National Cast Iron Pipe Co. participated. Awards totaled 2745 tons and brought the year's aggregate to 4500 tons, compared with 2517 tons for the same period a year ago.

Corpus Christi, Tex. — American Cast Iron Pipe Co. has been awarded the contract for pipe to be used for improvements and extensions by the city water and gas departments, on a bid of $76,285.

Seattle — Inquiry is nominal. Hughes & Co., Spokane, representing Pacific States Pipe Co., Provo, Utah, submitted the low bid to Spokane, for 550 tons of 6 and 8-inch cast iron water pipe.

—LAST CALL—

1939

MACHINE & TOOL PROGRESS EXHIBITION

Convention Hall, Detroit

MARCH 14 to 18

(inclusive)

ASTE

Already more than double the size of the spectacular 1938 Exhibition. New machines—new tools—new processes to attract virtually every important executive concerned with production. (Last year 23,755 registered at the show with its 167 exhibitors).

Sponsored by the American Society of Tool Engineers coincident with its 1939 annual convention—with technical symposiums on "Surface Finishing" and "New Developments and the Tool Engineer".

If you have not already reserved space, write or wire today. A few 10x10, 15x20, and 20x20 booths still available.

AMERICAN SOCIETY OF TOOL ENGINEERS

Ford Lamb, Exec. Secretary

2567 W. Grand Blvd., Detroit, Mich.

Cast Pipe Placed

2500 tons, 4 to 12-inch, Los Angeles; 1100 tons to United States Pipe & Foundry Co., Burlington, N. J., 840 tons to National Cast Iron Pipe Co., Birmingham, Ala., and 560 tons to American Cast Iron Pipe Co., Birmingham, Ala.

Cast Pipe Pending

1080 tons, city of Chicago pipe yards, United States Pipe & Foundry Co., Burlington, N. J., low.

550 tons, 6 and 8-inch, for Spokane, Wash.; Hughes & Co., Spokane, low, representing Pacific States Cast Iron Pipe Co.

250 tons, 6, 8 and 10-inch, for Lewiston, Idaho; bids Feb. 6.

192 tons, 6 to 10-inch, Lewiston, Idaho; bids opened.

Unstated tonnage, new waterworks, Bolivar, O.; bids in, George Reiss, Canton, O., engineer.

Rails, Cars

Track Material Prices, Page 85

Railroad buying continues at a better rate, for rails, cars and locomotives. Last week Chicago, Rock Island & Pacific distributed 40,100 tons and Missouri Pacific 31,110 tons.

Southern Pacific has distributed orders for 12,440 tons of rail fastenings for use with 40,000 tons of rails recently placed. Portions went to Columbia Steel Co., Colorado Fuel & Iron Corp., Rail Joint Co., P. & M. Co., National Lock Washer Co. and American Brake Shoe & Foundry Co.

Orders for 85 locomotives are now pending, including 40 steam units for Southern Pacific, 15 for Union Pacific and 30 diesel-electric switchers for Atchison, Topeka & Santa Fe.

Bethlehem Steel Co.'s Seattle branch has booked 6650 tons of tie plates for western roads, 4250 tons for Union Pacific and 1200 tons each for Northern Pacific and Spokane, Portland & Seattle.

American Car & Foundry Motors

Co., New York, has booked six motor coaches for Virginia Electric & Power Co., Richmond, Va., four for Scranton Transit Co., Scranton, Pa., and two for Carolina Coach Co., Raleigh, N. C.

Union Pacific will build 2000 all-steel box cars at its shops at Portland, Oreg., Grand Island and Omaha, Nebr.

Department of the interior has awarded 3100 tons of rails to Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., for relocation of Southern Pacific tracks at Shasta dam, California. Colorado Fuel & Iron Corp., has been given a tonnage of tie plates and other accessories and Pettibone, Mulliken Corp., Chicago, for covered split switches for the same project.

Domestic freight car awards in January reached a low mark, only three being placed. This was the poorest showing since July, 1938, when none was placed. Comparisons are given below:

	1939	1938	1937	1936
Jan.	3	25	17,806	2,050
Feb.	.....	109	4,972	6,900
March	.....	680	8,155	632
April	.....	15	9,772	4,427
May	.....	6,014	4,732	8,900
June	.....	1,178	548	5,200
July	.....	0	1,030	7,229
Aug.	.....	182	1,475	225
Sept.	.....	1,750	1,216	1,750
Oct.	.....	2,537	1,355	2,210
Nov.	.....	1,232	275	1,550
Dec.	.....	2,581	275	23,450
Total	.....	16,303	51,611	64,523

Car Orders Placed

Navy, two 50-ton flat cars, to Magor Car Corp., Passaic, N. J.; expected to award two 50-ton box cars shortly.

Rail Orders Placed

Chicago, Rock Island & Pacific, 40,100 tons; Carnegie-Illinois Steel Corp., 27,400 tons, Inland Steel Co., 8000 tons, Colorado Fuel & Iron Corp., 4700 tons.

Cotton Belt Route, 1000 tons, to Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.

Delaware, Lackawanna & Western, 6000 tons; 5000 tons to Bethlehem Steel Co. and 1000 tons to Carnegie-Illinois Corp.

Missouri Pacific, 31,110 tons; 7600 tons to Tennessee Coal, Iron & Railroad Co., remainder to Inland Steel Co. and Colorado Fuel & Iron Corp.

Southern Pacific, 3100 tons, to Tennessee Coal, Iron & Railroad Co., Birmingham, Ala.; bought by interior department for relocation at Shasta dam project, California.

Car Orders Pending

Missouri Pacific, 1025 fifty-ton flat-bottomed coal cars, 125 fifty-ton box cars; bids Feb. 27.

Missouri Pacific, 1000 fifty-ton gondolas; for its subsidiary, Missouri-Illinois, 125 fifty-ton box and 25 fifty-ton gondolas; bids Feb. 27.

Locomotives Pending

Missouri Pacific, two 2000-horsepower diesel passenger locomotives; three 900-horsepower and two 600-horsepower switching locomotives, court permission granted.

Atchison, Topeka & Santa Fe, 30 diesel-electric switchers; bids asked.

Buses Booked

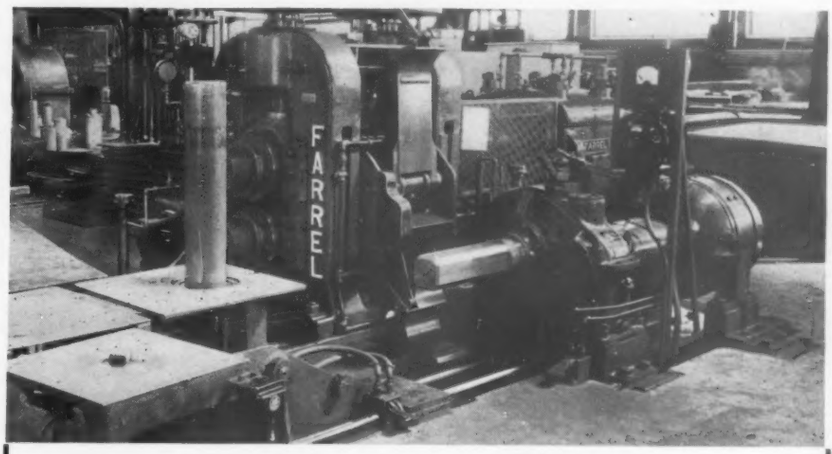
Mack Trucks Inc., Long Island City, N. Y.: Fifty buses for Rochester Transit Corp., Rochester, N. Y.

Wire

Wire Prices, Page 85

Cleveland — Moderate improvement in demand from farm centers is unable to offset the easing in specifications for manufacturers' wire. The decline in demand from automotive interests and other consumers is considered temporary, however, some sellers predicting a reversal of the present trend late this month or early in March. Earlier estimates of probable spring demand in agricultural areas for merchant products have been revised downward slightly. Dealers' stocks are considerably smaller than a year ago.

Birmingham, Ala. — Demand for wire products holds up. Production



FARREL CONSTANT TENSION REELS

Improve Strip Quality
Increase Mill Output
Reduce Rolling Cost

In the cold rolling of metal strip efficient winding of the finished strip is an important factor in the quality of material, rate of output and production cost.

The Farrel Tension Reel with Jaw Type Wrapper, Stripper and Up-Ender illustrated above is one of several types of reeling equipment we make to facilitate winding and subsequent handling. It provides constant tension under positive control from empty to full reel, keeping the metal flat and straight and maintaining uniform gauge.

The reel drive is an enclosed herringbone gear reduction unit with the low speed shaft extended in the form of a spindle on which either a solid or collapsible reel is rotated for winding the strip. Close control of tension is accomplished by automatic regulation of current input to the motor. All controls are conveniently located within easy reach of the operator.

The recent installations of thirty-three Farrel Constant Tension Reels in eight plants, with a high percentage of these repeat orders, is the best indication of their successful operation.

We make various types of reels designed to fit specific requirements and shall be glad to tell you how they can be applied to your rolling mills to give you the advantages of improved quality, increased output and lower cost.

FARREL
FARREL-BIRMINGHAM COMPANY, Inc.
ANSONIA, CONN.
New York • Buffalo • Pittsburgh • Akron • Chicago • Los Angeles

Behind the Scenes with STEEL

Detoured

■ You have heard us elaborate at great length from time to time on a subject that is very close to our heart—but now that heart is broken. We refer to the way STEEL is read by a proven average of slightly less than six readers per copy. We refer also to the ingenious methods employed by various subscribing companies and our own dear Readers Service Department to give a scientific touch to this pass-along system of readership. The RSD has furnished hundreds of subscribers with attractively printed routing slips which are tipped to the front of each week's STEEL. Others have devised their own but in every case (so we naively believed) STEEL was smoothly geared into the functioning of modern business—read with avid interest—and eagerly anticipated by each reader. We would even have wagered Ann's best rattle on our belief in this but now, alas, we find ourselves disillusioned. From an apparently faithful subscriber last week came the awful truth. "Is STEEL circulated among your executives by routing slips?" we asked confidently and came the mocking reply: *Just wanders around.* Desperately, we suppose, like a lost child!

Back Pat

■ But then, we were pepped right up again by a touching compliment from one of our oldest readers—six words which digest the whole story of the job STEEL is doing: *I would feel lost without it.*

Cherchez les Femmes

■ And from a Cleveland valve manufacturer last week came a letter which got us all excited—or rather it was what was clipped to the letter. Here is something hot, we thought, as we gingerly touched the little green booklet with the alluring title: *What I Know About Women!* Might as well learn young, we figured, opening up to the first page and getting all set for most anything. Most anything, that is, except one blank page after another. What a foolish feeling!

Names Dept.

■ The Chicago *Daily Tribune,* in their search for names that fit, apparently overlooked one in their own back yard. Mr. Machinist is chief engineer of the Dudley Lock Corp., Chicago.

Praise From John Bull

■ From London comes a recent issue of the *World's Press News* with quite a discussion on what day is logical to publish a weekly business paper. An analysis of London's weekly journals shows almost all coming out on one of the last three days of the week, for what reason no one knows. Then the bulk of the article proceeds to give a tremendous pat on the back to STEEL, "one of America's best-known industrial weeklies and a paper of the most progressive type, carrying plenty of up-to-the-minute special articles, news-stories, trend-of-trade graphs, and market reports in its editorial body". They seem to agree that Monday is the one day for publication considering all factors of timeliness, completeness and logic, and of course it is for just those reasons that STEEL reaches you on Monday morning, with a complete picture of your industry up until the close of business the previous Friday.

Bragging Again

■ Vol. 1, No. 1 of the *LeBlond News* made its appearance recently in the town of floods and machine tools and in it was quoted an old Chinese proverb: *Most of us know so little it is folly to be modest about the few things we know well.* Perhaps that is why we don't mind mentioning just once again that this magazine STEEL really has something on the ball.

—SHRDLU

is estimated at 80 per cent and there is consistent demand, mostly in small lots, for virtually all products.

Shapes

Structural Shape Prices, Page 84

Pittsburgh — Structural production continues on the same levels, although fewer new projects of large tonnage are coming out. The increasing number of private projects is heartening. Current lists are showing up much better from this standpoint.

Chicago—The market for structural shapes is quiet. Decrease in activity is attributed to lack of pressure to close on pending jobs until more favorable weather.

Numerous tonnages, of 500 to 2000 tons are pending, but not likely to close immediately. Some are said to date back 30 to 60 days, but most are believed to be live items and closings are expected to begin soon.

Philadelphia — Several large structural jobs still await dates for bids, but contracts placed the past few days were the smallest in several months. Potomac and Susquehanna river bridges, still to come up for bids, each will require over 10,000 tons.

Buffalo — Activity in the structural market is gaining momentum as an increased number of government jobs, calling for moderate tonnage are either up for bids or due to be released soon. Largest jobs pending at the present time are the $1,200,000 Kleinhans music hall and $2,700,000 convention hall in Buffalo and the proposed $4,000,000 bridge to replace the collapsed "Honeymoon Bridge" at Niagara Falls. Drillers started preliminary work on the new bridge this week. A bond issue is proposed to finance the new span.

St. Louis—Moderate improvement

Shape Awards Compared

	Tons
Week ended Feb. 11	10,385
Week ended Feb. 4	*20,545
Week ended Jan. 28	26,671
This week, 1938	8,748
Weekly average, year, 1938	21,566
Weekly average, 1939	26,913
Weekly average, January	32,362
Total to date, 1938	90,925
Total to date, 1939	*161,479

*Revised.

Includes awards of 100 tons or more.

is noted in the structural steel situation. The largest pending project is a terminal market building, Kansas City requiring 1350 tons. Operations at fabricating plants average about 30 per cent of capacity.

Cleveland — Outstanding recent award went to Truscon Steel Co., Youngstown, O., involving 440 tons for the Cleveland Jockey club grandstand addition, North Randall, O. Lombardo Bros. Construction Co., Cleveland, are low bidders on the Big creek intercepting sewer project, Cleveland. Public work continues to dominate inquiries and awards, although some improvement is noted from private sources. The larger fabricators are fairly busy, but the reverse is true among the smaller concerns. This condition tends to keep fabricated bidding prices at discouraging low levels.

San Francisco—Few new inquiries for structural shapes have come out recently and awards totaled only 1962 tons. This brought the aggregate to date to 16,080 tons, compared with 6959 tons for the same period last year.

Seattle—Largest tonnage pending totals about 2600 tons for units 3, 4 and 11 of the Lake Washington pontoon bridge and approaches, general contracts awarded. Unstated interests have booked 480 tons for the Bonneville dam power house.

Shape Contracts Placed

1400 tons, music hall, Purdue university, West Lafayette, Ind., to American Bridge Co., Pittsburgh; through George A. Fuller Co., Chicago, general contractor.

1200 tons, Shoshone river pipe line, Cody, Wyo., to Consolidated Steel Corp., Los Angeles.

780 tons, grade elimination work, Absecon, N. J., to Bethlehem Steel Co., Bethlehem.

765 tons, furnace building, No. 2, Electro Metallurgical Co., Sheffield, Ala., to Virginia Bridge Co., Roanoke, Va.

500 tons, piling, Cuyahoga river straightening project, Cleveland, to Bethlehem Steel Co., Bethlehem, Pa.; through L. A. Wells Construction Co., Cleveland.

480 tons, Bonneville dam powerhouse, to Bethlehem Steel Co., Bethlehem, Pa.; L. H. Hoffman, Portland, general contractor.

470 tons, repairs to bridge 3450 over Mississippi river, Inner Grove, Minn., for Chicago, Rock Island & Pacific railroad, to American Bridge Co., Pittsburgh.

440 tons, Cleveland Jockey club grandstand addition, North Randall, O., to Truscon Steel Co., Youngstown, O.

375 tons, overhead crossing, Greybull, Wyo., for state, to Kansas City Structural Steel Co., Kansas City, Kans.

300 tons, state bridge C-21-2, Cummington, Mass., to Bethlehem Steel Co., Bethlehem, Pa.

275 tons, eleven oil derricks, Lion Beach, Calif., for various oil companies, to unnamed interests.

200 tons, Billy Rose swimming pool, world's fair, Flushing, N. Y., to J. K. Welding Co., Long Island City,

190 tons, Godchaux mills, section No. 1, Raceland, La., to Ingalls Iron Works, Birmingham, Ala.

175 tons, addition to municipal power house, Wyandotte, Mich., to Whitehead & Kales Co., Detroit.

165 tons, building additions, for Bear Brand Hosiery Co., Kankakee, Ill., to Bethlehem Steel Co., Bethlehem, Pa.

165 tons, repairs to bridge 5993, Garfield avenue, Duluth, for state, to American Bridge Co., Pittsburgh.

160 tons, Cross Island parkway grade separation, New York, to American Bridge Co., Pittsburgh.

160 tons, state bridge, Mt. Clemens, Mich., to R. C. Mahon Co., Detroit.

155 tons, bascule bridge, Cambridge, Md., for state, to American Bridge Co., Pittsburgh.

150 tons, building, Kankakee, Ill., to Bethlehem Steel Co., Bethlehem, Pa.

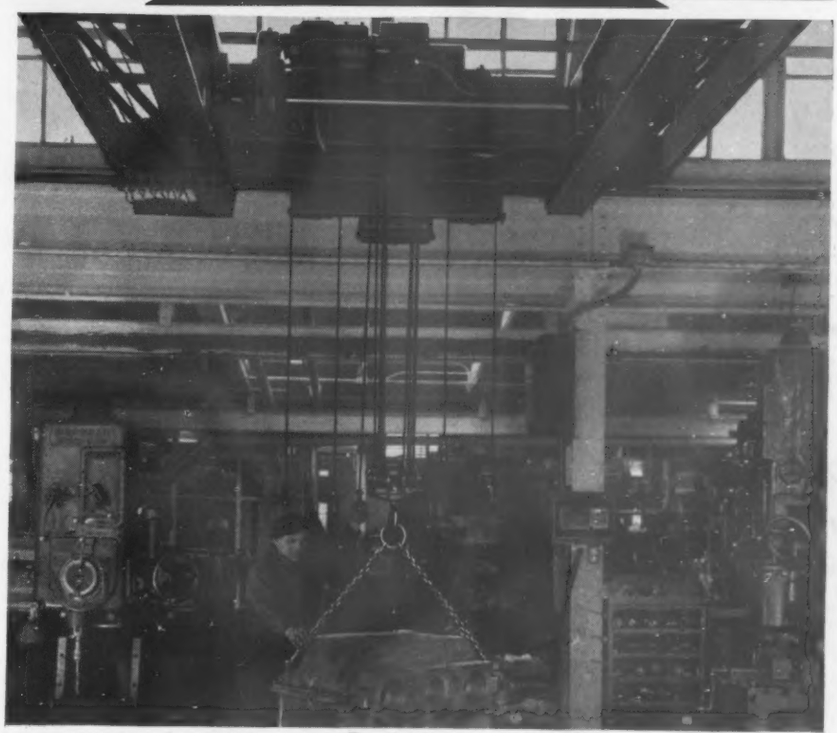
150 tons, steel ribs, treasury department, Los Angeles, invitation 49,739, to Commercial Shearing & Stamping Co., Youngstown, O.

145 tons, library, 89-14, Parsons boulevard, Jamaica, N. Y., to American Bridge Co., Pittsburgh.

145 tons, building, Toledo metropolitan housing authority, Toledo O., to Toledo Shipbuilding Co., Toledo, O.

140 tons, nurses' home, for Elizabeth

P&H TRAV-LIFT CRANES



In Machine Shops

● The moving of heavy parts around your shop becomes the simple matter of pushing buttons when you use a P&H Trav-Lift. Designed for intermittent service, these units offer you the advantages of low cost, easy operation and great flexibility in handling loads up to 15 tons. They are described in Bulletin H-13. Harnischfeger Corporation, 4411 West National Avenue, Milwaukee, Wisconsin.

HARNISCHFEGER CORPORATION

HOISTS • WELDING ELECTRODES • MOTORS P&H EXCAVATORS • ELECTRIC CRANES • ARC WELDERS

Steel Magee hospital, Pittsburgh, to Levinson Steel Co., Pittsburgh.

138 tons, bridge, Pardo dam, Los Angeles, to Consolidated Steel Corp., Los Angeles.

132 tons, school, Athens, O., to Bethlehem Steel Co., Bethlehem, Pa.

130 tons, store, S. H. Kress & Co., Tuscaloosa, Ala., to Ingalls Iron Works, Birmingham, Ala.

130 tons, shop building 44, state hospital, Utica, N. Y., to Utica Steam Engine & Boiler Co., Utica, N. Y.

130 tons, state bridge, Owosso, Mich., to Fort Pitt Bridge Works, Pittsburgh.

125 tons, five oil derricks, two for Union Oil, one for Texas Co., one for Stanley Oil Co. and one for Herley-Kelly, Montebello, Calif., to unnamed interests.

115 tons, beam bridge, Fitchburg, Mass., for state, to Bethlehem Steel Co., Bethlehem, Pa.

100 tons, boiler supports, etc., McChord Field, Wash., heating plant, to unstated interests; W. S. Leland Co., San Francisco, general contractor.

100 tons, four oil derricks, two for Universal Consolidated Oil Co. and two for Union Pacific Co., Long Beach, Calif., to unnamed interests.

100 tons, 13 radial gates and 12 radial gate hoists, specification 1152-D, Boulder Canyon project, California, to unnamed interest.

100 tons, bridge, Fayston, Vt., to American Bridge Co., Pittsburgh.

Shape Contracts Pending

2300 tons, piling, substructure, bridge, Susquehanna river, Perryville, Md.; Robt. C. Reitz, Lancaster, Pa., low on general contract; unstated tonnage shapes will be required for superstructure, for which bids will be announced shortly.

1350 tons, market and terminal building, Kansas City, Mo.

793 tons, Big Creek intercepting sewer, Cleveland; Lombardo Bros. Construction Co., Cleveland, low; includes 268 tons of bearing piles and 175 tons of plates.

600 tons, manufacturng buildings, Agar Mfg. Corp., Kansas City, Mo.

600 tons, state overpass, Albany, Oreg.; Mountain States Construction Co., Eugene, Oreg., general contractor.

600 tons, additions, Cambridge High and Latin school, Cambridge, Mass.; bids Jan. 30 rejected, over appropriation, to be readvertised.

500 tons, plant buildings, at Lewistown, Pa., and Roanoke, Va., for American Viscose Corp.

500 tons, two jib cranes, Mare Island, Calif., and Bremerton, Wash., navy yards; Star Iron & Steel Co., Tacoma, Wash., low at $274,200.

490 tons, highway bridges, New Jersey, route 6, sections 8A and 8B; bids Feb. 24.

325 tons, food terminal, Union Pacific railroad, Denver.

250 tons, state highway bridges, Bradford, Vt.

245 tons, Park school, board of education, Ossining, N. Y.

225 tons, auditorium, Barre, Vt.

210 tons, Washington state viaduct, Spokane county; bids in at Olympia.

200 tons, undercrossing, Spangle, Wash., for state.

200 tons, arcade roof, Billy Rose enterprises, World's fair, Flushing, N. Y.

200 tons, addition to building, Pomeroy's store, Harrisburg, Pa.; bids in.

175 tons, Washington high school, Massillon, O.

175 tons, school, Cortland, N. Y.

150 tons, building addition, Minneapolis Star, Minneapolis.

150 tons, state bridge, Dover, Vt.

150 tons, high school, Front Royal, Va.; bids in.

140 tons, storage warehouse, International Harvester Co., Baltimore.

140 tons, school, Phelps, N. Y.

120 tons, beam bridge, Fitchburg, Mass., for state.

Unstated tonnage, stop log guides and appurtenances, Coulee dam; Schmitt Steel Co., Portland, low.

Unstated tonnage, gate hoists for Roza diversion dam, Washington state; bids at Denver.

Unsated tonnage, superstructure, Jefferson Memorial, Washington; bids Mar. 3.

Reinforcing

Reinforcing Bar Prices, Page 85

Pittsburgh — Reinforcing bar prices are fairly steady at present, with a good many jobs bringing published prices. There are still some weaknesses, but in general the market is stronger. New projects are not coming out in good volume, but there is still considerable unplaced tonnage on the books arising out of public works projects which are now in the early stages of construction. Placements are numerous recently with considerable public work swelling the total.

Cleveland—Inquiries from private sources are almost at a standstill and little improvement is expected this month. Public work remains substantially below the level of November and December. Most fabricators have cleared books of tonnage placed during that period, reflected in low bids on the small tonnage now appearing.

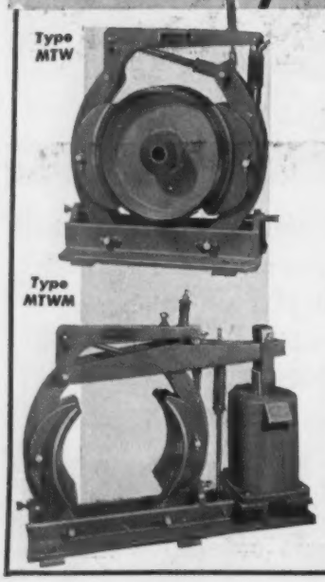
Chicago—Concrete steel bar in-

Concrete Bars Compared

	Tons
Week ended Feb. 11	10,132
Week ended Feb. 4	11,699
Week ended Jan. 28	23,077
This week, 1938	5,570
Weekly average, year, 1938	6,959
Weekly average, 1939	13,384
Weekly average, January	14,736
Total to date, 1938	37,286
Total to date, 1939	80,301

Includes awards of 100 tons or more.

Specify HYDRAULIC-ACTUATED
WAGNER INDUSTRIAL BRAKES
WHERE DEPENDABLE SERVICE IS Essential



Ruggedness characterizes every construction detail of Wagner Hydraulic-Actuated Industrial Brakes —Welded steel parts . . . Hardened pins and bushings . . . and Cannonite brake wheels, are just a few of their many advantages. They are built to "stand up" under the kind of service that usually "takes the life" out of ordinary brakes.

Type MTW is for ordinary bridge service, the type MTWM is equipped with spring-set shunt solenoid release to provide locking device where desired.

If you want low brake maintenance of Cranes, Coke Pushers, Transfer Cars and similar equipment—specify Wagner Brakes. Write today for complete information.

138-3A

WAGNER ELECTRIC CORPORATION
INDUSTRIAL BRAKE EQUIPMENT
4904 Baum Blvd. Pittsburgh, Pa.

terests report business continuing at recent levels, with pending tonnage substantially unchanged. A large number of government-aided projects have closed, mostly under 100 tons, but considerable tonnage remains to be purchased. Private projects are coming more to the fore.

Philadelphia — Incoming tonnage continues in poor volume, with few jobs involving over 100 tons. About 700 tons for the Perrysville, Md., bridge substructure continues outstanding, on which Robert C. Reitz is low bidder for the general contract.

San Francisco — The reinforcing bar market was active and 6175 tons were placed, bringing the aggregate for the year to 20,104 tons, compared with 16,969 tons for the corresponding period in 1938.

Seattle—Approximately 8500 tons of reinforcing involved in Units 3 and 4 of the Lake Washington pontoon bridge project will be placed soon. Already about 5000 tons for this job have been awarded local suppliers. No important new projects have developed.

Reinforcing Steel Awards

3200 tons, Bonneville dam powerhouse superstructure, to unnamed Portland interests; L. H. Hoffman, Portland, general contractor.

1123 tons, Lazarus department store, Columbus, O., to Pollak Steel Co., Cincinnati; through Frank Messer & Sons, general contractors, Cincinnati.

450 tons, water works, Manitowoc, Wis., to Inland Steel Co., Chicago; through Joseph T. Ryerson & Son Inc., Chicago; A. L. Jackson Co., contractor.

400 tons, Farrington high school, Honolulu, T. H., to unnamed interest.

350 tons, additional, Sears, Roebuck & Co., Long Beach, Calif., to Consolidated Steel Corp., Los Angeles.

300 tons, incinerator building, Wadsworth, Kans., to Sheffield Steel Corp., Kansas City, Mo.

300 tons, two buildings, McChord Field, Wash., to Northwest Steel Rolling Mills, Seattle.

260 tons, sewage plant, Austin, Minn., to Bethlehem Steel Co., Bethlehem, Pa.; McGough Co., contractor.

260 tons, building, Link Belt Co., Indianapolis, to Pollak Steel Co., Cincinnati.

250 tons, Gregory hall, Urbana, Ill., to Laclede Steel Co., St. Louis; W. E. O'Neil Co., contractor.

250 tons, bridge over Missouri river, Miami, Mo., to Sheffield Steel Corp., Kansas City, Mo.; Massman Construction Co., contractor.

200 tons, concrete piles, post office terminal annex, Los Angeles; general contract to Raymond Concrete Pile Co., Washington building, Los Angeles.

200 tons, sewage disposal plant, Madison, Wis., to Inland Steel Co., Chicago, through Joseph T. Ryerson & Son Inc., Chicago; Paul Nagtegaal & Sons, contractor.

200 tons, nurses' home, Madison General hospital, Madison, Wis., to Inland Steel Co., Chicago; through Joseph T. Ryerson & Son Inc., Chicago; J. Nelson Co., contractor.

200 tons, Washington grade school, Madison, Wis., to Bethlehem Steel Co., Bethlehem, Pa.; through Kupfer Iron & Foundry Co.; J. H. Findorff & Son, contractor.

200 tons, Burroughs school, Madison, Wis., to Inland Steel Co., Chicago; through Joseph T. Ryerson & Son Inc., Chicago; J. H. Findorff & Son, contractor.

200 tons, ward buildings, Manteno, Ill., to Calumet Steel Co., Chicago; Permanent Construction Co., contractor.

175 tons, health service building, Hamilton, Mont., to Republic Steel Corp., Cleveland; through Truscon Steel Co., Youngstown, O.; McGough Bros., contractors.

170 tons, for livestock pavilion, Indianapolis fairgrounds ,to Pollak Steel Co., Cincinnati; through J. L. Simmons Co. Inc., general contractor, Indianapolis.

160 tons, Marquette school, Madison, Wis., to Bethlehem Steel Co., Bethlehem, Pa.

145 tons, two college buildings for junior college, Santa Rosa, Calif., to Ceco Steel Products Corp., San Francisco.

127 tons, treasury department, Los Angeles, invitation 49771, to unnamed interest.

125 tons, Keppel high school gymnasium, Alhambra, Calif., to Consolidated Steel Corp., Los Angeles.

125 tons, three concession buildings, Rockaway Beach, N. Y., to Truscon Steel Co., Youngstown, O.; Graves-Quinn Corp., contractor.

120 tons, sewage disposal plant, Waterloo, Iowa, to Laclede Steel Co., St. Louis; through Waterloo Construction Co.

120 tons, two schools, LaCrosse, Wis., to Bethlehem Steel Co., Bethlehem, Pa.; Standard Construction Co., contractor.

115 tons, village creek levee, White River, Ark., to Jones & Laughlin Steel Corp., Pittsburgh; through Arkansas Foundry Co.; E. Morgan, contractor.

107 tons, high school, Vallejo, Calif., to Richards Steel Co., San Francisco.

100 tons, high school, Santa Maria, Calif., to unnamed interest.

100 tons, grade separation, Hillside avenue on Cross Island parkway, Queens county, New York, to Truscon Steel Co., Youngstown, O.; A. & J. Cianciulli, contractor.

100 tons, school addition, Cudahy, Wis., to Republic Steel Corp., Cleveland; through Truscon Steel Co., Youngstown, O.

Reinforcing Steel Pending

802 tons, addition to press building, R. R. Donnelly & Sons Co., Chicago.

700 tons, substructure, bridge, Susquehanna river, Perrysville, Md.; Robert C. Reitz, Lancaster, Pa., low on general contract.

530 tons, high school, Rockford, Ill., C. B. Johnson & Son Co., Chicago, general contractor.

492 tons, five highway bridges, Passaic county, Clifton, N. J.

400 tons, barracks A and B, Schofield barracks, Hickam Field, T. H.; Robt.

BY THE BOX OR BY THE MILLION!

You can get BOTH BRIGHT & HIGH CARBON CAP SCREWS from stock!

• Cleveland Cap Screws produced in full bright finish give you the best in appearance with adequate tensile strength. High carbon heat treated Cleveland Cap Screws insure maximum strength with good appearance. Made by the Kaufman Process, *patented*, our own plant development, both are equally accurate in all dimensions and a Class 3 thread fit. Both types of Cleveland Cap Screws are available in fine and coarse thread, either out of stock, or made to your specifications in any quantity desired. THE CLEVELAND CAP SCREW COMPANY, 2935 East 79th Street, Cleveland, Ohio.

Address the Factory or Our Nearest Warehouse:

CHICAGO, 726 W. Washington Blvd.
PHILADELPHIA . 12th & Olive Sts.
NEW YORK . . . . 47 Murray Street
LOS ANGELES . 1015 East 16th St.

•

CLEVELAND CAP SCREWS
SET SCREWS • BOLTS AND NUTS

STREAMLINED

AS AN AIRLINER

THE Chevalier SUITE

Steel OFFICE CHAIRS

Styled In The Spirit Of Today's Business

● Streamlined, these new Chevalier steel chairs are the smartest in the entire Harter line.

In harmony with the latest trend in office designing—the idea that the office should combine comfort and efficiency with smart simplicity—we asked one of the country's foremost designers to do a suite of steel chairs for us. The Chevalier is the result.

In these new chairs the best of modern, flowing lines is blended with the traditional comfort and sturdiness of Harter Steel Chairs. They will add individuality and distinction to any office interior.

Harter also leads in posture seating, with chairs designed to make correct posture easy and natural. They encourage workers to sit erect—in comfort.

Free! Write for the new Harter catalog—showing chairs smartly styled in steel, for fine offices.

The HARTER *Corporation*

DESK 329

STURGIS MICHIGAN

MANUFACTURER OF THE WORLD'S FINEST *Steel* SEATING EQUIPMENT

MODERNIZE HARTERIZE

E. McKee Ltd., Los Angeles, low at $479,000.

380 tons, Marine Drive apartments, Chicago.

250 tons, postoffice garage, St. Louis; bids Feb. 16.

250 tons, Proctor & Gamble plant addition; bids in.

170 tons, Children's Memorial hospital, Chicago.

158 tons, superstructure assembly shop, naval base, Alameda, Calif., general contract awarded to J. I. Barnes Construction Co., Santa Monica, Calif.

150 tons, bridge, Park avenue, Waterloo, Iowa.

125 tons, central school, East Bloomfield, N. Y.; bids Feb. 21.

120 tons, sewage plant, Peru, Ill.

120 tons, courthouse, New Roads, La.

110 tons, school, Hoisington, Kans.

110 tons, senior high school, Park Rapids, Minn.

105 tons, grade crossing, Cross Island parkway, Queens, N. Y.; A. and J. Sianeiulli, New York, low.

100 tons, film exchange building, Chicago; bids in.

100 tons, cancer institute, Madison, Wis.

100 tons, police and fire station, East St. Louis, Ill.; Dickie Construction Co., general contractors.

Unstated tonnage, fourth section, Chicago subway; bids Feb. 16.

Pig Iron

Pig Iron Prices, Page 86

Pittsburgh—Buying is hand-to-mouth, only occasional carloads moving. Production is unchanged, but since some producers are shipping from stock, additional blast furnaces are expected to be lighted late this month. Foundry coke demand continues light.

Cleveland—Releases hold at about the January level, with little change expected in total shipments this month. Steady movement of foundry coke points to sustained foundry operations. Production of automotive castings is better than expected.

Chicago—January levels are being maintained in shipments of both pig iron and foundry coke. Last month was the best in this respect in more than a year. Automotive and farm equipment needs are principal supports to demand, although railroad requirements are increasing.

New York — Pig iron demand is slightly more active on a small gain in the melt and some protective buying to insure adequate supply while adverse weather prevails. Consumers generally have only small lots on hand and have been inconvenienced by delayed deliveries.

Philadelphia — Pig iron shipments are holding up well compared with January, when the movement was the largest in over a year. Demand for quick shipments is seen as indicating low consumer stocks. The melt is sustained at 45 to 50 per cent. Soil pipe makers are more active.

Buffalo—Shipments are sustained near the best level for the year to date, with producers hopeful of an upturn in sales for spring consumption. Demand for both automotive and miscellaneous castings is steady.

Cincinnati—With tonnage still due against old contracts, new buying of pig iron is small. Shipments are close to the January rate. Demand for castings here is tending upward, but elsewhere in the district there is little change.

Birmingham, Ala.—Sixteen of the district's 18 blast furnaces continue in production, but there is some falling off in spot business in merchant iron. A large part of the supply, however, is going into finished steel.

Toronto, Ont.—Sales are increasing, with repeat orders appearing from melters in lots ranging up to 400 tons. Forward contracting is quiet. Shipments approximate 3500 tons a week, about 70 per cent of which is foundry iron and the balance malleable.

Scrap

Scrap Prices, Page 88

Pittsburgh — Scrap prices generally continue firm. Sellers find it difficult to cover recent heavy melting steel orders at a profit, and the market for No. 1 now may be quoted $15.50 to $16. A small sale of this grade or compressed sheets was made at $16.25, while other mills have paid $16 and down-river mills still are offering the same figure for shipments from outside points. Secondary grades are stronger, with No. 2 steel being taken by a broker at $15. Railroad steel on a recent list sold at slightly less than $16.25, down nearly 50 cents from the last offering.

Cleveland — Closing of railroad scrap offerings has developed the fact that this material went at about the current market levels, or about $15.25 for No. 1 heavy melting. Other grades appeared to be in line. A mill in southwestern Ohio absorbed most of the Baltimore & Ohio offerings. Quotations at Cleveland and Youngstown are unchanged.

Chicago — Scrap prices are firm, brokers paying as high as $14 for No. 1 steel. The market is quiet, however, since mills will pay no more than this figure, and sellers

are reluctant to accept orders. Prices of some grades have become highly nominal in the absence of consumer buying.

Philadelphia — About 10,000 tons of heavy melting steel, mostly No. 2, has been sold for export at the closed Pencoyd steelworks, Pencoyd, Pa., at a reported price of over $14.00. No. 1 steel is stronger here on export buying at $15 and $15.25, Port Richmond. No. 2 is bringing $13.50. Domestic business is quiet, with small tonnages of No. 2 steel moving at $13. No. 1 steel is relatively scarce, but other grades are available freely.

Buffalo — Sentiment has suffered from the decline in steelmaking and a holdup in shipments by one leading consumer, but dealers are holding to recent prices. Consumers are seeking lower quotations.

Detroit—Scrap trading continues unusually light, with prices unchanged and no important lists bid last week. A Fisher list will close Wednesday. Some scattered inquiries for cast grades have appeared from foundries. The leading steelmaker is practically out of the market.

Cincinnati — The market is sluggish, and dealers are uncertain over the future price trend. Material is coming out slowly, and yard supplies are not excessive, but available tonnages are ample. Flood waters had but slight effect on shipments. Dealers' prices are unchanged but lean toward weakness on some grades.

St. Louis—Scrap buying has been quickened by the purchase of 10,000 tons of No. 2 steel by a local consumer, but the $12.50 price was a reduction of 50 cents. Another mill bought about 2000 tons of No. 1 railroad steel, the first purchase by this consumer in more than four years. The market tone has improved as a result of the absorption of distress scrap by these sales.

Seattle — In view of uncertainty in the export market, dealers pay more attention to domestic sales. Rolling mills are buying, paying a top price of $12 for No. 1, and $11 for No. 2. Export prices are somewhat higher but new business from Japan is spasmodic and small.

Toronto, Ont.—Dealers are making steady shipment. Steel Co. of Canada, out of the market for a few weeks, again is taking delivery, as also are most other consumers. Heavy melting steel, turnings and bundles are in good demand, with foundries supplying an active call for stove plate and machinery cast. Dealers have lowered bids for heavy melting steel.

Warehouse

Warehouse Prices, Page 87

Cleveland—Shipments have declined so far this month, the reduction for some warehouses being about 10 per cent. Practically all products are affected, with sheets possibly quieted less than other items. Inquiries are regarded as encouraging.

Chicago—Trend in warehouse business is sidewise and is considered normal for this period. Inquiries are fairly active, but little improvement in orders is expected until about the middle of March.

Philadelphia — Galvanized sheets now are 4.33c, the result of a revised method of quoting. The market now is based on 4.07c, Sparrows Point, Md., for lots of ten bundles and over, 4.32c for less than ten bundles, plus 26 cents freight. Points outside Philadelphia take the base plus freight. Business is somewhat disappointing but is close to the January volume.

Buffalo—Sales hold around recent levels. Activity in local aviation plants is reflected in better demand for certain products. Inclement weather lately tended to retard business.

Cincinnati—Warehouse sales are well sustained. Industrial and coal mining needs provide the bulk of business, but a few early inquiries for building steel point to better demand from this source with the approach of spring.

Seattle — Spring buying has not developed and sales are about on a level with a month ago. Sheets continue in fair demand but in small lots.

Tin Plate

Tin Plate Prices, Page 84

Tin plate production continues to gain, now being around 50 per cent. Since current business still consists largely of general line can material, producers look for a substantial increase in orders and operations with the opening of the food packing season. Low stocks will cause improved consumption of sanitary can plate to be reflected quickly in demand to mills. Tin plate producers are stocking little tonnage. Prices are steady and occasion little discussion.

Ferroalloys

Ferroalloy Prices, Page 86

New York—Ferromanganese shipments are slightly heavier, although the February volume may fall a

INVESTIGATE THE NEW
NUMBER 1 OF A SERIES
Eureka
Tool Steel Welding Rods
No. 70-W—NON-SHRINK
No. 71-M—NON-SHRINK
No. 8510—WATER HARDENING
No. 1215—AIR HARDENING

Particularly designed for the manufacturing and repairing of dies, fractured or worn tools, surfacing carbon and alloy steels, shear blades, etc., these electrodes give amazing results.

Eureka No. 70-W and 71-M tool steel electrodes are self-quenching, give an oil-hardening steel deposit at the point of fracture, and do not seriously affect the heat treatment of the parent metal adjacent to the weld. In procedure, the electrode is positive, and the work negative, but the results are always POSITIVELY satisfactory.

There is a slight difference between 70-W and 71-M. The 71-M will give a little lower hardness number and will exhibit a trifle more resistance to shock and stress. 70-W, therefore, is more frequently used for repairing light steel metal dies, while 71-M is better suited for heavy duty and impact dies.

There is no danger of cracking after cooling, and in a wide range of applications uniformity, strength and durability are constant.

Write us for information on our other wire products.

A EUREKA Welding Wire for every purpose.

WELDING EQUIPMENT & SUPPLY CO.
2720 East Grand Blvd.
DETROIT, MICH.

Nonferrous Metal Prices

Spot unless otherwise specified. Cents per pound

Feb.	Copper Electro, del. Conn.	Copper Lake, del. Midwest	Copper Casting, refinery	Straits Tin, New York Spot	Straits Tin, New York Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
4	11.25	11.37½	10.20	45.87½	45.80	4.85	4.70	4.50	20.00	11.25	35.00
6	11.25	11.37½	10.25	46.00	45.90	4.85	4.70	4.50	20.00	11.25	35.00
7	11.25	11.37½	10.25	45.75	45.67½	4.85	4.70	4.50	20.00	11.25	35.00
8	11.25	11.37½	10.22½	45.65	45.60	4.85	4.70	4.50	20.00	11.25	35.00
9	11.25	11.37½	10.17½	45.70	45.60	4.85	4.70	4.50	20.00	11.25	35.00
10	11.25	11.37½	10.17½	45.50	45.40	4.85	4.70	4.50	20.00	11.25	35.00

MILL PRODUCTS

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 11.25c Conn. copper

Sheets

Yellow brass (high) 17.31
Copper, hot rolled 19.37½
Lead, cut to jobbers 8.00
Zinc, 100 lb. base 9.75

Tubes

High yellow brass 20.06
Seamless copper 19.87½

Rods

High yellow brass 12.62
Copper, hot rolled 15.87½

Anodes

Copper, untrimmed 16.62½

Wire

Yellow brass (high) 17.56

OLD METALS

Nom. Del. Buying Prices

No. 1 Composition Red Brass

New York 6.35-6.47½
Cleveland 6.75-7.00
Chicago 6.00-6.25
St. Louis 6.00-6.25

Heavy Copper and Wire

New York, No. 1 ..... 8.00-8.12½
Cleveland, No. 1 ..... 7.75-8.00
Chicago, No. 1 ..... 7.50-7.75
St. Louis 7.50-7.75

Composition Brass Borings

New York 5.50-5.75

Light Copper

New York 6.62½-6.87½
Cleveland 6.00-6.25
Chicago 5.87½-6.12½
St. Louis 6.00-6.25

Light Brass

Cleveland 3.25-3.50
Chicago 3.75-4.00
St. Louis 3.50-3.75

Lead

New York 4.10-4.35
Cleveland 3.50-3.75
Chicago 3.75-4.00
St. Louis 3.25-3.50

Zinc

New York 2.50-2.62½
Cleveland 2.00-2.25
St. Louis 2.00-2.25

Aluminum

Borings, Cleveland 6.25-6.50
Mixed, cast, Cleveland 6.75-7.00
Clips, soft, Cleveland 14.75-15.00
Mixed cast, St. Louis 7.00-7.25

SECONDARY METALS

Brass ingot, 85-5-5-5, less carloads. 10.50
Standard No. 12 aluminum ... 12.75-13.25

Nonferrous Metals

New York—Unsettlement in foreign metal markets caused buyers here to reduce their purchases as the week progressed. Other important factors which tended to hold down new business were the failure of general industrial activity to make the gains previously expected and the uncertain tone in Wall street. Total lead and slab zinc statistical reports for January showed small increases in stocks but these were not considered bearish.

Copper — With the exception of Wednesdaf when buying increased in in both domestic and foreign markets, daily sales were light. Export copper eased gradually to around 10.07½c, c.i.f., while resale electrolytic was available down to 10.37½c, Connecticut, and casting copper at 10.12½c, f.o.b. refinery. All first hands continued to quote unchangel levels on the basis of 11.25c, Connecticut.

Lead — Total stocks of lead increased 6730 tons during December which included a decline of 1461 tons in refined stocks alone. Consumers took moderate tonnages early in the week and showed most interest in metal for March delivery. Estimates of January deliveries have been revised upward to around 43,000 tons, indicating a reduction in stocks for that month. Prices held at 4.70c, East St. Louis.

Zinc—The January report showing an increase of only 1616 tons in stocks was received favorably in the trade. Following fair business on the first three days of the week, sales tapered while shipments held up well. Prime western held steady at 4.50c, East St. Louis.

Tin—On rather light turnover, tin prices here fluctuatel narrowly in line with the London market which in turn was influenced by gyrations in the Wall street security market. Straits spot eased from around 46.00c at the beginning of the week to 45.50c at the close.

Antimony—Only routine business was reported with prices unchanged at 11.25c, New York, for American spot in cases and nominally 14.00c, duty paid New York, for Chinese spot.

Steel in Europe

Foreign Steel Prices, Page 87

London—(*By Radio*)—Outlook of the steel industry in Great Britain is slightly more hopeful. Foundry pig iron market shows no activity but East Coast hematite is moving at a better rate than recently. Some steel furnaces in the northeastern district are being relighted. Semi-finished mills show more activity. Demand for structural steel is slightly better but rails and shipbuilding steel are dull. Morris Motors Ltd. plans production developments to cost £3,250,000.

The Continent reports improved demand, especially for semifinished steel, merchant products, structurals and sheets.

Iron Ore

Iron Ore Prices, Page 88

Baltimore—January iron ore arrivals here, according to figures just compiled, involved 180,637 tons, as compared with 186,123 tons in December and 165,187 tons in January a year ago. The largest total over recent months was 220,050, in October.

Manganese ore shipments of 39,270 tons in January were the heaviest since last September, when 46,219 tons were received. They compared with 34,250 tons in December, 38,800 tons in November and 54,099 in January a year ago.

Only one arrival of chrome ore came in, 5800 tons. This compared with none in December, 6617 in November and 19,242 in January, 1938, which was the largest total last year.

Ferromanganese shipments totaled 2197 tons, plus 1364 barrels. This compared with 4625 tons plus 438 barrels and 78 cases in December, 1600 tons in November and 200 tons in October. One cargo of pyrites came in, amounting to 6983 tons.

Details of ore importations here during the period from Jan. 17 to Feb. 5, include, follow: Iron ore, 3553 tons from Whyalla, Australia, Jan. 18; 3504 tons, Whyalla, Jan. 21; 9067 tons, Narvik, Sweden, Jan. 21; 7133 tons, Narvik, Jan. 22; 21,200 tons, Cruz Grande, Chile, Jan. 24; 21,700 tons, Cruz Grande, Jan. 26; 10,500 tons, Daiquiri, Cuba, Jan. 29; 7530 tons, Whyalla, Jan. 31; 21,800 tons, Cruz Grande, Feb. 1; and 21,300 tons, Cruz Grande, Feb. 4.

Manganese ore arrivals comprised 7400 tons from Poti, Russia, Jan. 17; 5820 tons Durban, Cuba, Jan. 25; 6200 tons, Poti, Russia, Jan. 27; 8250 tons, Takoradi, Jan. 29; 1500 tons, Calcutta, India, Jan. 31; 1000 tons, Calcutta, Feb. 1; and 1000 tons, Calcutta, Feb. 5.

Other arrivals included 725 tons, plus 1364 barrels of ferromanganese from Oslo, Norway, Jan. 21; 20 tons Stockholm, Sweden, Jan. 22; and 800 tons, Drammen, Norway, Jan. 24. A shipment of 5800 tons of chrome ore came in from Nuevitas, Cuba, Jan. 29 and 2000 tons of zinc concentrates from Buenos Aires, Argentina, Feb. 1.

Anchor Chain Needs Spur Nickel-Steel Bars

A rising demand for nickel-steel bars for manufacture of die-lock chain has accompanied the heavy increase in shipbuilding, both merchant and naval. Better demand for cast steel anchors, weighing from 8000 to 9000 pounds each, also reflects greater shipyard activity. From an extremely low point, makers of die-lock chain have increased operations in the last year nearly to capacity in some instances.

More general and increasing use of this type of chain, the steel bars containing an alloy of 3.5 per cent nickel, has brought a reduction in weight and link diameters and therefore the size of such bars. For merchant ships bar diameters average 2.25 inches and for naval vessels sizes have been reduced a quarter of an inch or more, including anchor chain for battleships.

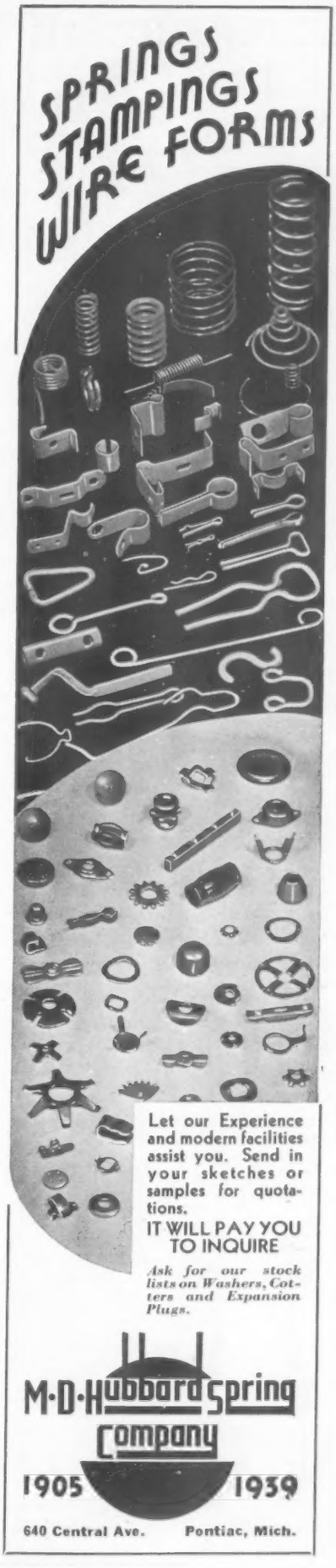
Most navy requirements are produced in chain shops at Boston navy yard, which also make considerable chain for the lighthouse bureau.

Palm Oil at Record Low

Philadelphia — Palm oil, used in tinning black plate, has been offered at 2.80c per pound, f.o.b. New York, or what is understood to be the lowest price on record. A year ago, this oil was selling at 6 cents per pound. Demand for dollar exchange is believed the cause. Belgian Congo is one of the principal sources.

Equipment

Seattle — General Electric Co. is low to Bonneville administration for furnishing single phase, 25,000-kva outdoor transformers for the North Bonneville substation. Electrical equipment continues in active demand and automotive equipment is being purchased for highway maintenance by state and counties. Construction machinery is also being bought by contractors engaged in heavy construction work.


SPRINGS
STAMPINGS
WIRE FORMS
Let our Experience and modern facilities assist you. Send in your sketches or samples for quotations.
IT WILL PAY YOU TO INQUIRE
Ask for our stock lists on Washers, Cotters and Expansion Plugs.
M·D·Hubbard Spring Company
1905 1939
640 Central Ave. Pontiac, Mich.

Construction and Enterprise

New York

CONESUS, N. Y.—Conesus Steel Co. has been incorporated and is headed by Lewis Snath, Conesus, to deal in raw and finished steel products.

HUDSON FALLS, N. Y.—City is taking bids on Contracts No. 3, 4, 5 and 6 in construction of a sewage disposal plant estimated to cost $253,000. Whitman, Requardt & Smith, Albany, N. Y., consulting engineers.

JAMESTOWN, N. Y. — Jamestown Metal Equipment Co. Inc. has awarded contract to Warren Construction Co., Jamestown, for constructing a one-story, 78 x 219-foot brick and steel addition to its plant.

NEW YORK—Liberty Steel Co. Inc. has been organized here with capital of 100 shares no par stock to engage in general metal business. Representative, Harold Garner, 1501 Broadway, New York.

NEW YORK—Consolidated Edison Co. of New York Inc. will alter and improve its steam-electric generating plant at 686 First avenue at estimated cost of $40,000. This does not include cost of equipment which will be installed.

ROCHESTER, N. Y.—Consolidated Machine Tool Corp. of America has awarded contract for plant addition costing $40,000. J. F. Ancona, Rochester, architect.

SAVANNAH, N. Y.—New York State Electric & Gas Corp., Ithaca, N. Y., will spend $25,000 in changing equipment in its light plant from 25-cycle to 60-cycle operation.

Connecticut

EAST HARTFORD, CONN.—East Hartford Iron Works, J. J. Kregelstein, representative, plans to build a 130 x 140-foot plant at cost of $40,000.

New Jersey

BURLINGTON, N. J.—Public Service Electric & Gas Co. has authorized expansion of its steam-electric generating station, involving installation of a new 100,000-kilowatt turbogenerator unit and high-pressure boilers. Entire project to cost about $12,000,000 and will be completed in 1940.

Pennsylvania

WARREN, PA.—Borough is making plans to construct a municipal sewage disposal plant costing $300,000. Project will mature late this year. C. Barwis, borough engineer.

Ohio

CANTON, O.—City, L. W. J. Cooper, service director, will probably receive bids soon on transformers, switches, wiring and lightning arresters to cost about $10,000. Consulting engineer, George A. Reese, Canton.

CELINA, O.—City, W. R. Cook, city manager, has completed plans and will advertise for bids this week in projected construction of sewage disposal plant and sewer system to cost $91,300. Paul A. Uhlmann, Columbus, O., consulting engineer.

OAK HARBOR, O. — Village, C. S. Teagarden, mayor, will probably take bids soon in projected construction of waterworks improvements which will cost about $130,000. Champe, Finkbeiner & Associates, Toledo, O., engineers.

ORRVILLE, O.—Village, C. W. Willamon, mayor, is taking bids due at noon, Mar. 3, on construction of a water softening plant as part of its $65,000 water system program. Plant involves mixing, settling, filtration and lime soda ash treatment. Bond or draft 5 per cent to accompany bids. Consultants, Hoover & Montgomery, Columbus, O.

SPRINGFIELD, O.—Ohio Edison Co., 47 North Main street, Akron, O., Mr. Funk, chief engineer, has plans by its engineering staff in a project to mature this year for improving its distribution lines, meter system and substations at cost of about $600,000.

ST. MARYS, O.—City, W. R. Cook, service director, has plans for the building of and will probably take bids soon on lines and transformers to cost an estimated $27,000. Necessary ordinances have been approved.

STEUBENVILLE, O. — City, Eugene Boyd, service director, takes bids due at noon, Feb. 21, on sewerage system improvements costing $240,000. Bond or certified check of 5 per cent to accompany bid. H. P. Jones & Co., Toledo, O., consulting engineers.

TOLEDO, O.—Toledo Scale Co., 3216 Monroe street, will take bids soon on construction of a 420 x 440-foot factory costing about $250,000.

TORONTO, O.—Ohio Edison Co., 47 North Main street, Akron, O., Mr. Funk, chief engineer, has plans by its engineering staff in a project which will mature this spring for additions and improvements in its power plant here at cost of about $3,500,000. Including new 35,000-kilowatt turbogenerator and boiler. (Noted Feb. 6.)

Michigan

BATTLE CREEK, MICH.—City, Thomas Thorne, clerk, is taking bids until 2 p.m., Feb. 20, on electric work involved in supplying power to and controlling 18 motors driving deep well pumps. Shoecraft, Drury & McNamee, Battle Creek, consulting engineers.

Illinois

MORRISON, ILL.—City will soon take bids on construction of a sewage treatment plant costing approximately $80,000. Has PWA funds. Consoer, Townsend & Quinlan, Chicago, consulting engineers in project.

ROCK ISLAND, ILL. — International Harvester Co., Chicago, has awarded first contract in construction of a 16 x 700-foot plant addition to Axel Carlson Co., Moline, Ill. Cost estimated at $40,000.

Indiana

INDIANAPOLIS—Hydraulic Steel Corp. has been incorporated with 100 shares no par value capital stock to manufacture and sell machinery and equipment. Resident agent, Ben Winston, 3510 North Pennsylvania street, Indianapolis.

Mississippi

MAGNOLIA, MISS. — Magnolia Electric Power association has been allotted $247,000 by REA for constructing rural power lines totaling 272 miles and extending through four counties.

Tennessee

JACKSON, TENN.—City, A. B. Foust, mayor, will receive bids Feb. 16 for manufacture and installation of watthour meters and accessories at estimated cost of $27,000. Sub-project E, engineers, Freeland, Roberts & Co., Nashville, Tenn.

MEMPHIS, TENN. — Electric power commission, T. H. Allen, chairman, Goodwyn Institute building, takes bids Feb. 16 for 4-kilovolt and 12-kilovolt distribution circuits costing total of $315,000.

Missouri

BUTLER, MO.—REA has allotted $375,000 loan to Osage Valley Electric Co-operative association for construction of 353 miles of rural power lines in three counties.

CENTERVILLE, MO. — Black River Electric Co-operative, Vincent Sutton, president, has completed preliminary plans for constructing 144 miles rural electric lines which will cost $194,000. E. T. Archer & Co., Kansas City, Mo., consulting engineers.

LATHROP, MO.—City, Gerald Cross,

SUPERIOR STRIP

for workability

All strip steel looks the same in the roll. Only two requirements should influence you in finally determining your source of supply—results based on tests in your own shop, and reputation of the maker.

Superior strip will bend, draw, weld and stamp better because it is inherently more versatile. Exacting control governs every step of its manufacture.

Superior strip has an uninterrupted background of more than 46 years of service—your assurance of consistent quality.

Our engineers will be glad to cooperate with you without obligation.

SUPERIOR STEEL CORPORATION

Executive Offices: Grant Building, Pittsburgh, Pa.
General Offices and Works: Carnegie, Pa.

To Alert SALESMANAGERS *and Salesmen*

When routing through Central New York, remember Hotel Syracuse is long on value, comfort and service. Centrally located. Four attractive restaurants.

Rates from $3.00 single

HOTEL SYRACUSE

Fay B. Mareness, Mgr. SYRACUSE, N. Y.

LOCOMOTIVE CRANES
CRAWLER CRANES
SHOVELS

OHIO

THE OHIO LOCOMOTIVE CRANE CO.
BUCYRUS OHIO

"COWLES"

ROTARY SLITTING KNIVES
for Modern Requirements
Highest Quality . . . . Long Service
The Product of Many Years Specialization
MADE BY TOOLMAKERS
COWLES TOOL COMPANY
Cleveland, Ohio

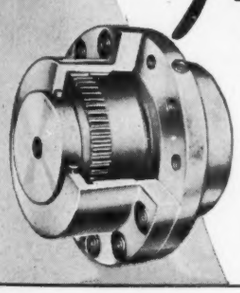
H. A. BRASSERT & COMPANY

Consulting Engineers for IRON, STEEL, FUEL and HEAVY METALLURGICAL INDUSTRIES . . . . .

310 SOUTH MICHIGAN AVENUE · CHICAGO

C. H. HUNT
CONSULTING ENGINEER
Specializing in Consultation on General Steel Mill and Industrial Plants
First National Bank Bldg., Pittsburgh, Pa.
Phone ATlantic 9885

WALDRON *Flexible* **COUPLINGS**



GEAR TYPE . . FRANCKE
"A Type and Size For Every Purpose"

All forged steel; exclusive construction features. Write for descriptive catalog giving sizes, ratings, prices. State type of drive.

Manufactured by
JOHN WALDRON CORP.
New Brunswick, N. J

TOOLING UP MADE EASIER
WITH STRENES METAL

Those tooling programs just around the corner give you a wonderful opportunity to try cast-to-shape Strenes metal. When orders go out, insist that at least one drawing and forming die be made of this remarkable alloy.

For over a year now, we've been giving you information on Strenes metal . . . how it eliminates up to 90% of all machine finishing . . . how it doesn't gall and "pick-up" . . . how it has amazing resistance to wear. We have even offered to pour your first Strenes casting absolutely on trial . . . which offer still stands.

We have pointed out that these Strenes metal characteristics have led to its adoption in many industries, by one-half the automotive companies, for example. We have shown you photographs of typical cast-to-shape Strenes metal dies . . . in the refrigeration field . . . in the farm implement field . . . in the specialties field.

We have photographed Strenes metal through a microscope . . . showing you its great uniformity of grain structure. And we have pointed out that Strenes dies *always* have this structure because we control every melt, licensing Strenes metal to no other foundry.

Now we urge you to *try* Strenes metal. Specify it for at least one drawing and forming job . . . keeping in mind that we pour your first die *on trial*. Take advantage of this unusual offer by sending us your pattern at your first opportunity. THE ADVANCE FOUNDRY CO., Dayton, Ohio.

REPRESENTATIVES:

W. F. Quinn, 5812 Malvern Ave., Philadelphia—H. L. Ayres Mach. Co., Box 45, Columbus, O.—Lake Shore Mach. & Supply Co., 1922 Peck St., Muskegon, Mich.—Geo. A. Rieke Co., 341 N. Crawford Ave., Chicago—H.W. Soward, S.W. Ohio Territory, 720 Superior Ave., Dayton, Ohio—R. C. Hubert, 208 Furniture Bldg., Evansville, Ind.—E. J. Walker, 2221 Arts Bldg., Toledo, Ohio– E. B. Harper, 75 Crosby Ave., Kenmore, N. Y., Buffalo Territory—Fawell Engineering Co., 1st Nat'l Bank Bldg., Pittsburgh—W. R. McDonough & Co., National Bldg., Cleveland—F. W. Peterson, 7310 Woodward Ave., Detroit—G. T. Osborne, 6037 Park Ave., Indianapolis, Ind.

STRENES METAL
FOR DRAWING AND FORMING DIES

representative, is receiving bids until 4 p.m., Feb. 23, on two 150-kilowatt diesel generating units and auxiliaries, power plant building, distribution system and street lighting. Cost to be about $75,000. E. T. Archer & Co., Kansas City, Mo., consulting engineer.

SEDALIA, MO.—Central Missouri Electric co-operative has been allotted $400,000 by REA to enable it to construct 385 miles rural electric lines serving 1203 consumers in two counties.

TRENTON, MO.—Grundy Electric Co-operative, Dr. C. H. Cullers, president, has completed preliminary plans to construct 700 miles of rural electric power lines through five counties at cost of $650,000. E. T. Archer & Co., Kansas City, Mo., consulting engineers.

Arkansas

MT. BLAKELY, ARK.—Arkansas Power & Light Corp., Pine Bluff, Ark., plans to construct a hydroelectric power development here at cost of about $8,000,000. S. C. Lynch, chief engineer, care of company.

Wisconsin

CHIPPEWA FALLS, WIS. — Standard Mfg. Co., builder of stokers, heating devices and tank covers, J. F. Gilmore, general manager, has plans underway for constructing a new factory building costing $30,000.

Minnesota

SPICER, MINN.—Village, I. L. Barber, clerk, takes bids to 3 p.m., Feb. 20, on water mains, tower and tank, pumping equipment and pump house. Druar & Milinowski, St. Paul, engineers.

Texas

BARTLETT, TEX.—City, R. W. Miller, mayor, will receive bids about March 15 for rebuilding and extending its waterworks at cost of $30,000. H. B. Gieb, Dallas, Tex., consulting engineer.

CORPUS CHRISTI, TEX.—Col-Tex Refining Co., Oklahoma City, Okla., plans to install power equipment and pumping machinery in projected asphalt plant which is to cost more than $1,200,000.

ELECTRA, TEX. — City, A. B. Corder, mayor, receives bids Feb. 21 for power plant improvements costing $23,000. Joe E. Ward, Wichita Falls, Tex., consulting engineer.

HOUSTON, TEX.—United Gas Corp. is receiving bids for construction of a five-building plant costing $125,000. Burns Roensch, Houston, architect.

PORT ARTHUR, TEX. — Jefferson county water control and improvement district No. 1, E. L. Stewart, president, plans construction of water works, sewers, storage reservoir, distribution system and sewage disposal plant at cost of $251,385. J. B. Converse & Co., care of M. D. Gates, Port Arthur, consulting engineers.

ROUND ROCK, TEX. — City, M. L. Blacklock, mayor, plans to build sanitary sewers, collecting system and sewage disposal plant to cost total of $90,000. J. W. Beretta Engineers Inc., San Antonio, Tex., consultants.

South Dakota

STURGIS, S. DAK.—City, A. W. W. Devers, auditor, accepts bids until 8 p.m., Feb. 24 in the projected construction of a complete sewage treatment works, collecting system, etc., to cost $136,500. Certified check 5 per cent to accompany bids. Chenoweth, Fraser & Forrette, engineers. (Noted Nov. 28.)

Nebraska

GERING, NEBR.—Bureau of reclamation, Denver, is receiving bids to 2 p.m., March 2, on furnishing 5000-kilovolt ampere synchronous condenser with control equipment; seven transformers; one disconnecting switch; and one lightning arrestor. Equipment to be installed by government in Gering substation, Kendrick project.

MADISON, NEBR.—REA has allotted $280,000 to Madison County Rural Public Power district to finance construction of 274 miles of lines in three counties.

OMAHA, NEBR.—Nebraska Power Co. has plans in progress for constructing 75 miles of rural electric transmission lines in Washington county at cost of $60,000. C. Minard, Omaha, chief engineer, in charge.

ST. EDWARD, NEBR.—Boone-Nance Rural Public Power district, P. P. Ceder, president, takes bids to 10 a.m., Feb. 23, on construction of 194 miles of rural electric lines in three counties. Certified check or bond 5 per cent to accompany bids. H. H. Henningsen Engineering Co., Omaha, Nebr., engineer.

WAYNE, NEBR.—Wayne County Rural Public Power district, A. G. Sideow, president, takes bids to 10 a.m., March 2, on construction of about 158 miles of rural transmission lines in four counties. H. H. Henningsen Engineering Co., Omaha, Nebr., consultant.

Iowa

CHEROKEE, IOWA—Cherokee County Rural Electric co-operative has received $130,000 REA allotment to finance construction of 116 miles rural power lines.

HUMESTON, IOWA—Village, Max Kyner, clerk, takes bids to 7:30 p.m., Feb. 27, on materials for constructing water treatment plant consisting of settling basin, aerator, mixing box, filter and incidentals. Certified check 10 per cent on Iowa bank to accompany bid. Engineer, M. G. Hall, Centerville, Iowa.

MARSHALLTOWN, IOWA—City council has final plans for construction of proposed sewage disposal plant and intercepting sewers to cost $463,636. Consoer, Townsend & Quinlan, Chicago, are consulting engineers in work.

ROCK RAPIDS, IOWA — Lyon Rural Electric co-operative has been allotted $138,000 loan by REA in the projected construction of 132 miles of rural transmitting lines serving 318 consumers.

SIOUX CITY, IOWA—REA has allotted $137,000 to Woodbury County Rural Electric Co-operative association for construction of 119 miles of rural transmission lines serving 311 consumers.

THOMPSON, IOWA—REA has allotted $288,000 to Winnebago Rural Electric Co-operative association, for construction of 258 miles of rural power transmission lines in three counties serving 706 customers.

Colorado

DENVER—Bureau of reclamation takes bids to Feb. 27 on four vertical shaft hydraulic turbines and four oil-pressure governors for the 103,000-horsepower turbines to be installed in Shasta power plant, California. Specification 823.

Montana

MILES CITY, MONT.—City is completing plans to install a water softening system in its water plant at estimated cost of $25,000. K. Weil, city engineer. (Noted Jan. 16.)

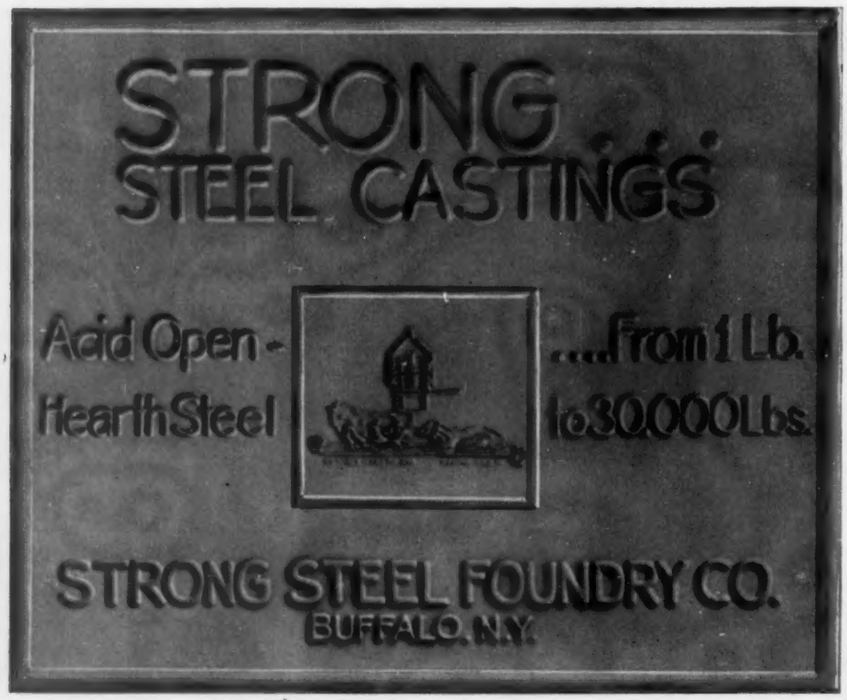
Pacific Coast

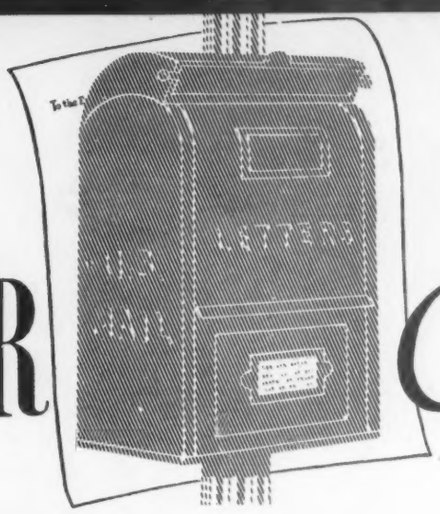
BELLINGHAM, WASH. — Portable Mining & Milling Co. has been incorporated by J. B. Hudson & Associates with $20,000 capital.

Canada

NELSON, B. C. — Reeves McDonald, Vancouver, B. C., proposes to build a milling plant for zinc and lead at cost of nearly $75,000.

WINNIPEG, MAN.—Municipal hydro-electric board, J. G. Glasco, manager, plans to make changes in its transmission lines at cost of $544,000.



READER  *Comments*

Readers are invited to comment upon articles, editorials, reports, prices or other editorial material appearing in STEEL. The editors cannot publish unsigned communications, but at their discretion may permit a writer to use a pseudonym when a bona fide reason exists for withholding his identity. Letters should be brief—preferably not exceeding 250 words.

Stabilizing Wage Income

To the Editor:

As with most manufacturing concerns, we have found it almost impossible to provide steady employment throughout the year because of seasonal fluctuations beyond our control. Realizing the importance to an employe of his weekly pay envelope and steady employment, we submitted the following plan to employes, which was accepted unanimously and became effective Nov. 8, 1938.

Normally, we operate 37½ hours per week. We increased this to 40 hours, the extra 2½ hours pay being deposited in a savings account in the name of four employes selected by the entire group, the share of each worker being credited in a special ledger. Should an employe give up his job he is paid his share of the savings.

We have found there are usually four months during which we cannot operate full time. In eight months full time operation employes will have saved wages for 80 hours of employment, which will enable us to operate four months at 32 hours and pay wages for 37 hours, taking five hours wages from the savings fund.

If we can operate one or two years without resorting to use of the stabilization fund we feel it will become large enough to take care of any extended slack period longer than that provided for.

As a protection against wiping out the savings fund we will withhold for certain lengths of time new products we have developed, releasing them to stimulate sales.

This plan will also benefit the company in production efficiency, enabling us to keep experienced employes and avoiding necessity of training new workers in the busy season. All employes receive full pay for national holidays and one week vacation. In addition to workmen's compensation we share half the cost of group insurance covering sickness and accident not included in compensation coverage. We employ about 150 people and relations with them always have been satisfactory on an open-shop basis.

HARRY GERMANOW

President,
Germanow-Simon Machine Co.,
Rochester, N. Y.

Seeks Real Employe Opinion

To the Editor:

Success in administering employe relations depends largely on knowledge of what the employe thinks of company practices and working conditions. A frank and honest expression of opinion is difficult to obtain and various methods are being tried to get at the real thoughts of workers.

One company, a large container manufacturer, has distributed booklets to all employes, one question on each page, with space for the employe's answer. No name is to be signed but department, sex and rate per hour are to be indicated, to permit some classification of answers.

The booklet is entitled "What I Think," and the questions are designed to give a cross section of employe opinion. Among the 26 questions the following indicate breadth of coverage:

Would you like to know more about the company's financial affairs? What would you like to know?

Would you like to know more about competitive containers which affect our company and your job?

Do you think the company is doing everything it can to provide steady employment? What could it do to make jobs more secure?

Do you understand the reasons for discharges? Do you believe they are fair? If not, why?

Do you understand what things are considered in making layoffs when they become necessary? What would you like to know about this?

Do you think you are fitted for a more responsible job? If so, why?

Do you have a satisfactory opportunity to present your opinions, suggestions and criticisms about your job? How could this be improved?

Do you understand why the company has time-study men and what their job is? If not, what would you like to have explained?

What things about the company do you like best? What don't you like?

If you had the job of managing your shift, your department or the plant, what would you do differently than the way it is done now?

If employes embrace the opportunity to express their real opinions under the cloak of anonymity the company should obtain many suggestions for improving the general understanding. Real and fancied grievances may be brought out into the light where they can be remedied. This seems like an effort in the right direction toward better employe relations.

SUPERINTENDENT

Philadelphia

"Tops" in the Industry

To the Editor:

We believe this is the most comprehensive Yearbook that you have ever produced and think it is "tops" in the industry.

The editorials are very timely and as far as the advertising is concerned, we believe that it will speak for itself.

FRANK W. DINE

General Manager,
Streine Tool & Mfg. Co.,
New Bremen, O.

KEEPING THINGS MOVING

One shirker in a whole production line . . . be it man or machine . . . can cause no end of trouble. American industry is the envy of the world today simply because, through better coordination of effort, we have learned how to achieve mass volume at low cost and with higher wages than is possible in any other country.

The secret of our success, of course, lies in the fact that better materials and machinery are constantly outmoding old methods. While studying your cost records do not overlook one of your most important operations . . . materials handling. There, one inefficient machine can drain profits as much as a whole department of shirkers.

Nowhere in industry during the past decade have greater strides been made toward lower costs than in locomotive cranes. If you have not kept in touch with this progress or recently studied your own handling costs, ask us to prove it. There is an Industrial Brownhoist of just the right type and size for your work.

GAS AND DIESEL CRANES
10 to 75 tons capacity

STEAM LOCOMOTIVE CRANES
10 to 200 tons capacity

CRAWLER CRANES

CLAMSHELL BUCKETS

COAL AND ORE BRIDGE CRANES

PILE DRIVERS

INDUSTRIAL BROWNHOIST

GENERAL OFFICES: BAY CITY, MICHIGAN

DISTRICT OFFICES: NEW YORK, PHILADELPHIA, PITTSBURGH, CLEVELAND, CHICAGO